

**DOLPHIN**  
TM

PARACHUTE HARNESS/CONTAINER SYSTEM

# **DOLPHIN OWNER'S MANUAL**

**AP 102 REVISED NOV 98**

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## **DOLPHIN OWNER'S MANUAL**

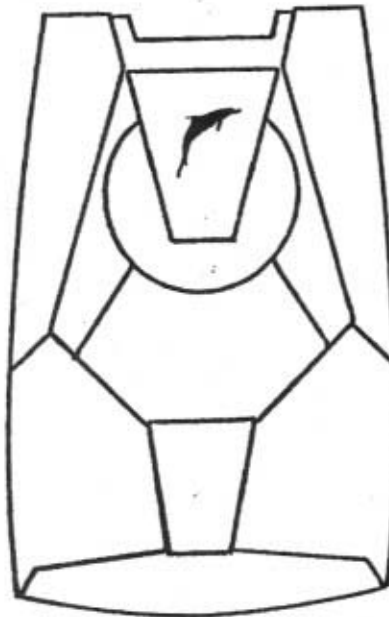
The purpose of this manual is to familiarize the user or parachute technician with appropriate packing, maintenance and deployment procedures for the DOLPHIN parachute harness/container system. It is NOT intended to be a course in parachute rigging or parachute jumping. This manual must be read and understood by anyone who intends to assemble, pack, maintain or use the DOLPHIN. It must be understood that it is the user who is ultimately responsible for the airworthiness of his or her equipment, whether a technician (rigger) is employed or not. The user is also responsible for assuring that he or she is qualified to participate safely in sport parachuting activities.

### **!!! WARNING !!!**

Serious injury or death can result from the use, attempted use, misuse, or failure to appropriately use any item of parachute equipment. No one should attempt to make a parachute jump unless he or she has been thoroughly trained by an experienced and qualified instructor. Even in the presence of such training, and even under direct supervision by qualified personnel, certain dangers exist which cannot be foreseen. Anyone attempting to make a parachute jump must be willing to assume the risk of serious injury or death, which could occur despite all attempts to prevent it. There is no guarantee that any item of parachute equipment will perform as intended. Any item of parachute equipment may malfunction or fail to function regardless of how well it has been manufactured, maintained, packed or deployed.

### **!!! THE USER ASSUMES ALL RISKS !!**

\* \* \*



## INTRODUCTION

The DOLPHIN parachute harness/container system is manufactured by THE UNINSURED ALTITUDE CONNECTION INCORPORATED, doing business as "ALTICO". The DOLPHIN is equipped with the well-known 3-Ring release system under a licensing agreement with The Relative Workshop Incorporated, and is approved by the Federal Aviation Administration under Technical Standards Order (TSO) C23d.

The DOLPHIN features both main and reserve containers mounted on the wearer's back, and an integrated harness and backpad system that affords superior strength and comfort to the wearer. Other standard features include a choice of main pilot chute locations (right legpad or bottom-of-container), a CYPRES installation kit, a Reserve Static Line, and extra-deluxe legpads. Simplicity of design makes the DOLPHIN easy to assemble, pack and maintain, and its rugged durability should, with normal care, provide many years of satisfaction.

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## DOLPHIN COMPONENTS

The DOLPHIN harness/container system is shipped from the factory with the following components:

HARNESS/CONTAINER  
MAIN RISERS WITH CONTROL TOGGLES  
MAIN DEPLOYMENT BAG  
MAIN THROWOUT PILOT CHUTE WITH BRIDLE  
MAIN LOCKING LOOP (INSTALLED)  
RESERVE STATIC LINE (RSL)  
RESERVE LOCKING LOOP (INSTALLED)  
RELEASE HANDLE ("CUTAWAY HANDLE")  
RESERVE RIPCORD  
RESERVE PILOT CHUTE  
RESERVE FREE BAG WITH BRIDLE  
BRIDLE FOR ROUND RESERVE (OPTIONAL)  
RESERVE CONTROL TOGGLES  
ONE EXTRA LOCKING LOOP  
RUBBER BANDS (FOR MAIN DEPLOYMENT BAG)  
RESERVE PACKING DATA CARD  
POCKET & CHANNEL INSTALLED FOR CYPRES AAD  
DOLPHIN OWNER'S MANUAL

All components listed above may be ordered individually from:

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## DOLPHIN HARNESS/CONTAINER SYSTEM

### ROUND RESERVE PACKING INSTRUCTIONS

The assembly and packing of a reserve parachute canopy into the DOLPHIN harness/container system must be accomplished by an FAA Senior Rigger or Master Rigger, or by the manufacturer of the DOLPHIN.

#### Required Tools:

One temporary pin  
One long pullup cord (4 to 5 feet)  
One packing paddle  
One .22 calibre rifle or pistol cleaning rod

#### Limitations:

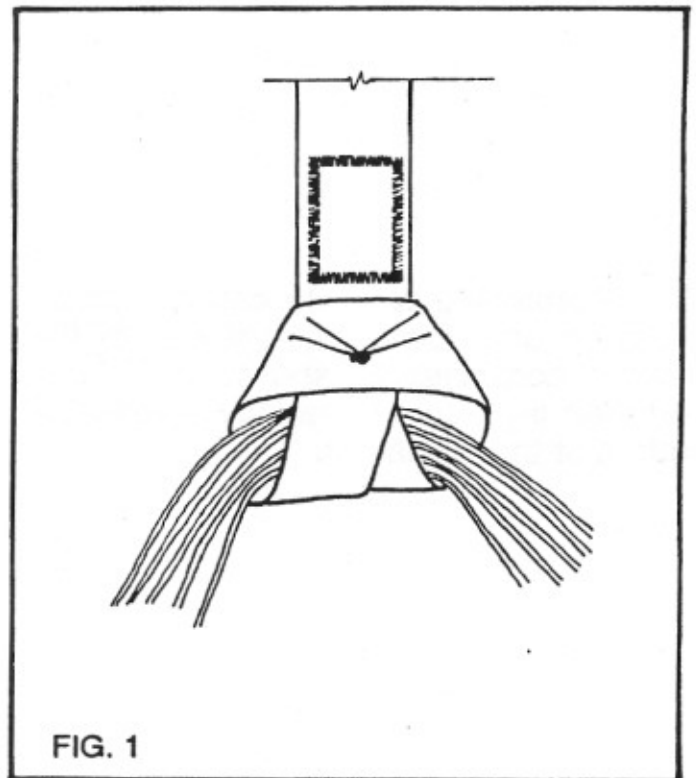
The DOLPHIN reserve container is compatible with a round reserve canopy *only* if the canopy is equipped with a full-stow diaper.

- 1) Inspect all major components of the reserve parachute:
  - a) Reserve pilot chute
  - b) Bridle
  - c) Reserve canopy, lines, connector links
  - d) Diaper
  - e) Harness/container system
  
- i) Overall integrity of harness and correct routing of webbing through hardware (see page 40)
- ii) Condition of grommets in reserve container flaps
- iii) Condition of reserve closing loop
- iv) Presence of toggle keeper rings 4" below the upper end of reserve risers
- v) Presence of reserve control toggles
- vi) Presence of reserve ripcord

- 2) To assemble a round reserve canopy with the DOLPHIN harness/container system, follow the canopy manufacturer's directions for inspection, routing and attachment of suspension lines and control lines, flaking and folding the canopy, and stowing the suspension lines on the diaper. If control toggles are called for by the canopy manufacturer, refer to pages 6-8 of this manual for one method of attaching control toggles.

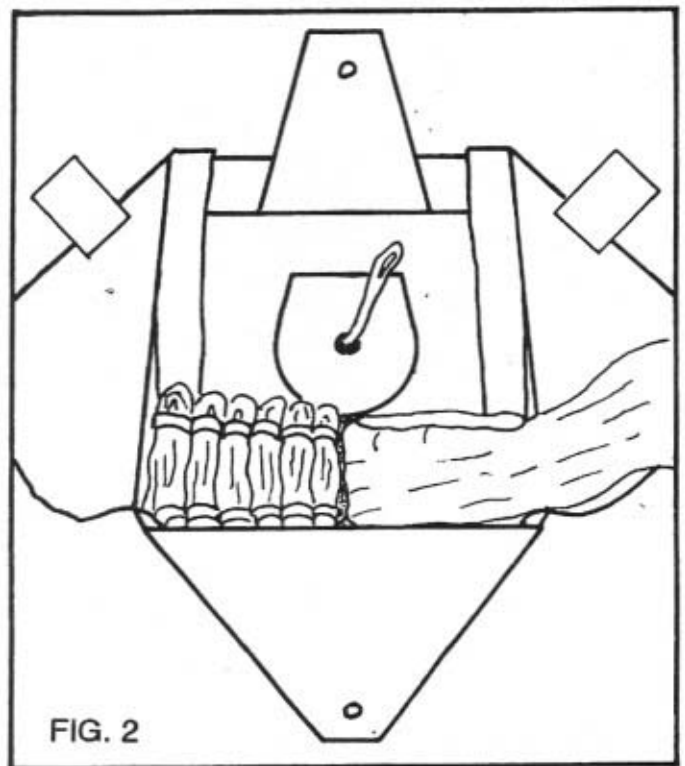
3) To attach the DOLPHIN reserve pilot chute to a round reserve canopy, use the bridle supplied by ALTICO. The bridle has a large loop at one end, and a smaller loop at the other end. The smaller loop should be used to attach the bridle to the canopy as shown in FIG. 1. Tack the loop securely in place, being sure that the lines at the apex of the canopy are free to move back and forth in the loop. The bridle must not be allowed to cinch down on the apex lines. Then attach the pilot chute to the other end of the bridle. (The purpose of the larger loop is to accommodate the top plate of the pilot chute.)

Only the DOLPHIN reserve pilot chute (Part No. D-71) should be used with the DOLPHIN harness/container system. Do not attempt to substitute any other reserve pilot chute unless it features a rigid top plate with a grommet installed in the middle, and uses the same type of spring as the military MA-1 pilot chute.

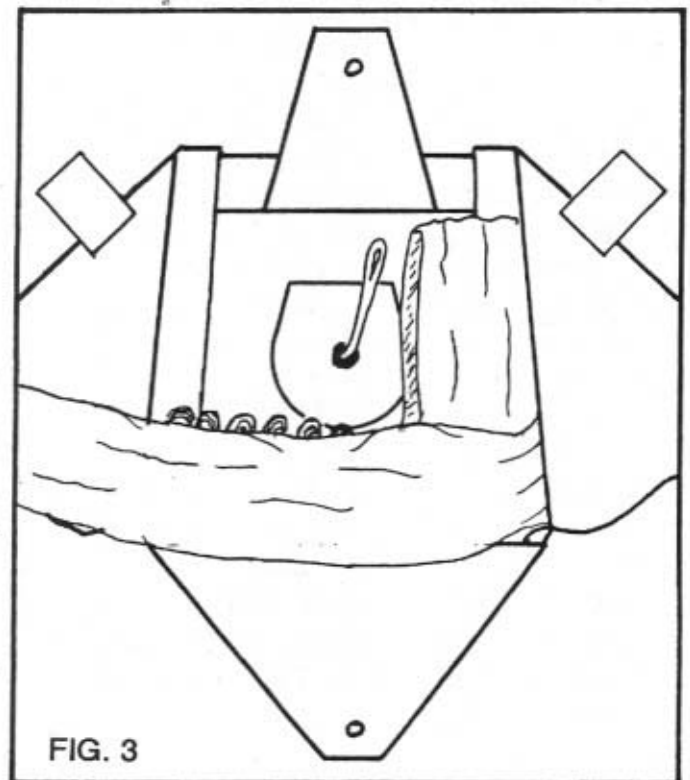




4) When the suspension lines have been stowed on the full diaper, there should be about 8" to 12" of lines unstowed between the diaper and the connector links. Bring the diaper up over the upper end of the reserve pack tray and lay the risers into the reserve container so that they lie flat with no twists. Now position the diaper in the lower left corner of the reserve container, and if the diaper does not fill the bottom of the container from side to side, make a small fold with the canopy in the lower right corner to equalize the bulk as shown in FIG. 2.

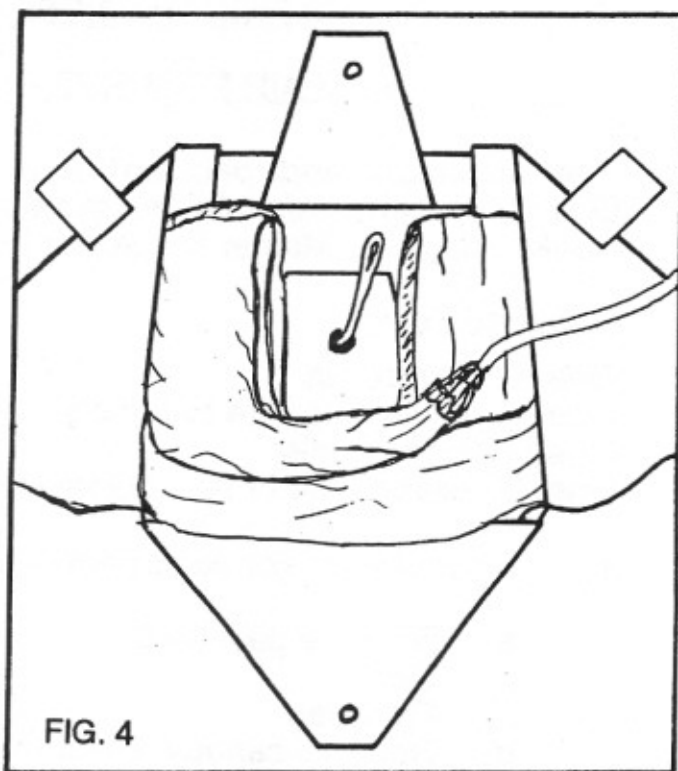


5) Continuing with the canopy, make a fold up and down the right side of the reserve container as shown in FIG. 3, and then lay a fold of canopy across the bottom of the container.



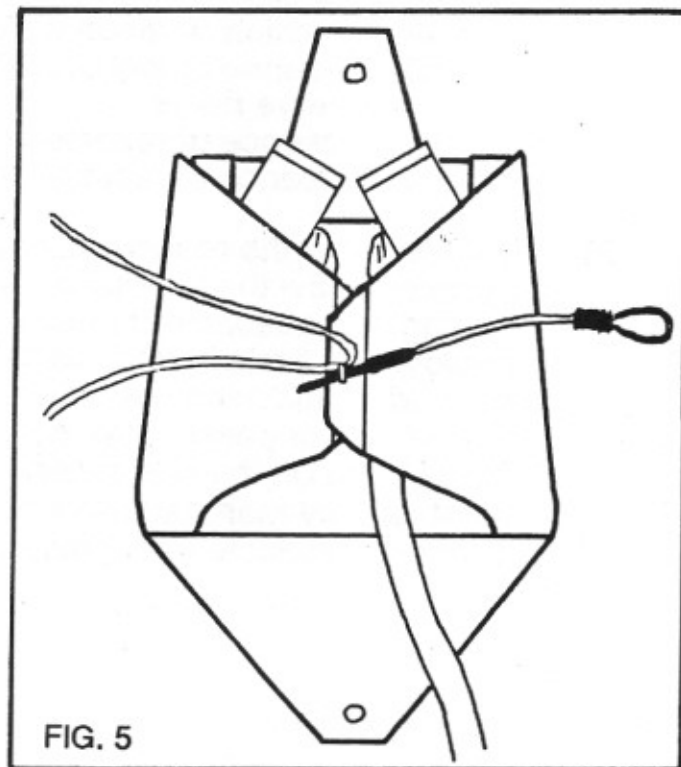
6) Make two folds up and down the left side of the container and then back across the bottom again as shown in FIG. 4. The rigger may vary the number of folds on each side and the number of passes across the bottom in order to evenly distribute the bulk. The object is to make a "U" shaped pack as symmetrical as possible, with both bottom corners of the container well filled.

7) Wherever the apex of the reserve canopy ends up, it *must not be packed into either of the bottom corners !!* The bottom corners are formed in a somewhat "pocketed" shape, and may tend to grip the apex of the canopy, which could retard deployment of the reserve.



8) Route the bridle out the bottom of the container and close the side flaps, either side first, securing with a temporary pin (see FIG. 5). Leave the tuck flaps out until all but the top flap have been closed. They will be used then to help "dress" the container.

The remainder of the reserve packing method for the DOLPHIN is exactly the same regardless of the type of canopy. Refer now to FIG. 11 of the Ram Air Reserve Packing Instructions, and continue with Step 7.



DOLPHIN HARNESS/CONTAINER SYSTEM  
RAM AIR RESERVE PACKING INSTRUCTIONS

The assembly and packing of a reserve parachute canopy into the DOLPHIN harness/container system must be accomplished by an FAA Senior Rigger or Master Rigger, or by the manufacturer of the DOLPHIN.

Required Tools:

One temporary pin  
One long pullup cord (4 to 5 feet)  
One packing paddle  
One .22 calibre rifle or pistol cleaning rod

- 1) Inspect all major components of the reserve parachute:
  - a) Reserve pilot chute
  - b) Bridle
  - c) Free bag
  - d) Reserve canopy, lines, slider, connector links
  - e) Harness/container system
    - i) Overall integrity of harness and correct routing of webbing through hardware (see page 40 )
    - ii) Condition of grommets in reserve container flaps
    - iii) Condition of reserve closing loop
    - iv) Presence of toggle keeper rings 4" below upper end of reserve risers
    - v) Presence of reserve control toggles
    - vi) Presence of reserve ripcord
- 2) To assemble the reserve canopy to the DOLPHIN harness/container system, follow the canopy manufacturer's directions for inspection, routing and attachment of suspension lines and control lines, setting deployment brakes, and flaking the canopy. One simple and effective method of attaching the control toggles to the control lines is as follows: After passing the control line downward thru the toggle-keeper ring on the rear reserve riser, locate the mark provided by most canopy manufacturers near the lower end of the control line. This mark indicates the point at which the toggle should be attached.

Double the control line back on itself below this mark and tie an overhand knot as shown in FIG. 1. The loop should be approx. 1" long, and the mark should be on the canopy side of the knot when it is tightened. Cut the remainder of the control line to a length of approx. 8" (with scissors, *not* a hot knife), and fingertrap the end into the control line. Do not sew the fingertrapped part. Now pass the knotted end of the control line thru the grommet as shown in FIG. 2, then put the lower end of the toggle thru the loop as shown in FIG. 3. Tighten the loop on the toggle as close to the grommet as possible.

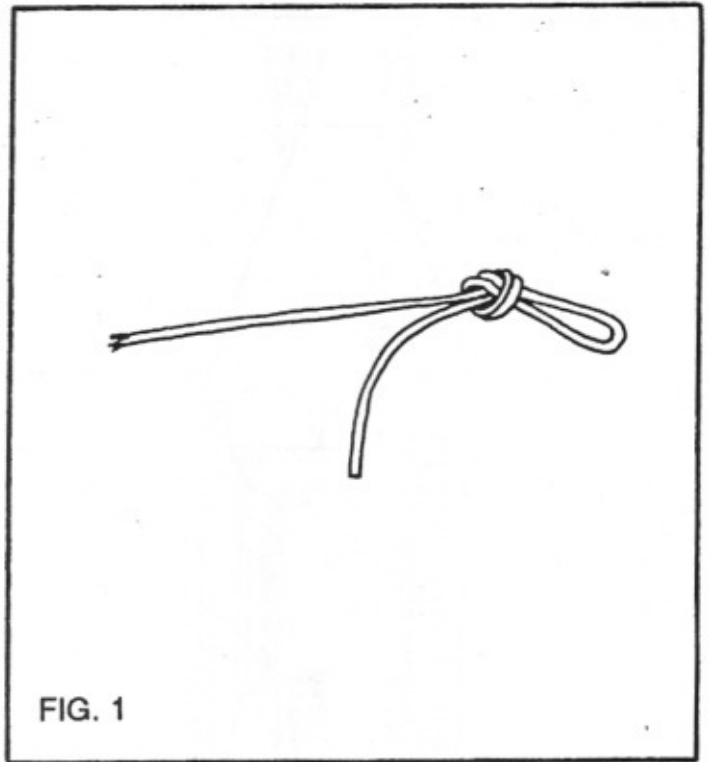


FIG. 1

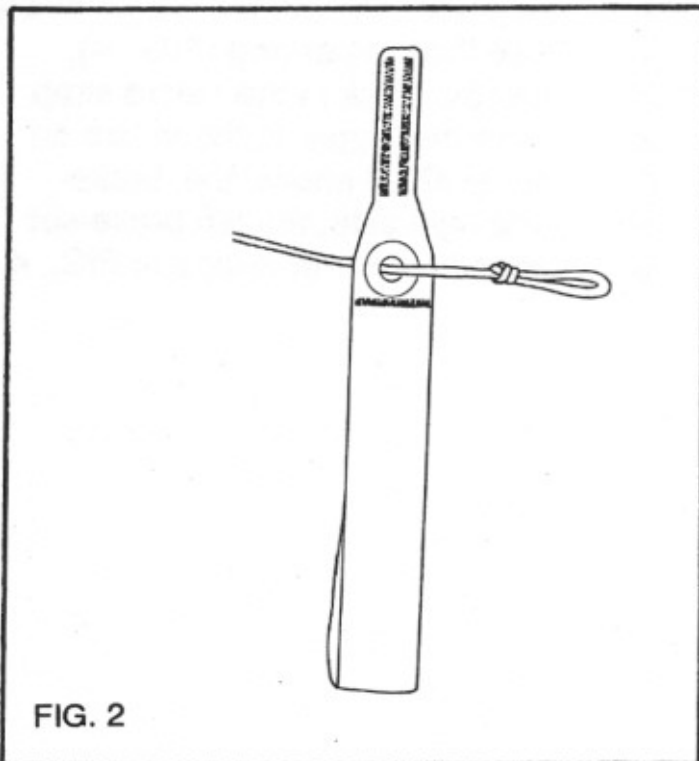


FIG. 2

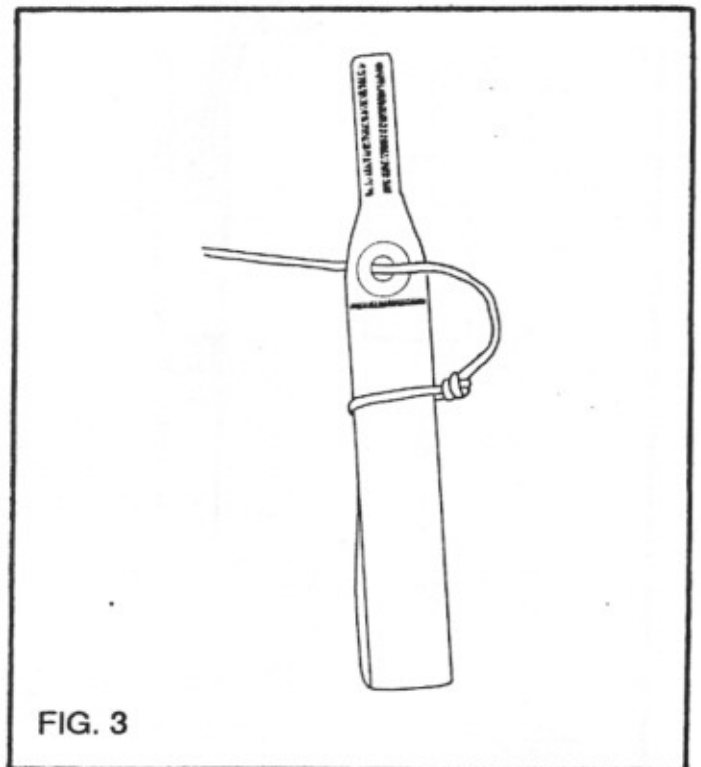


FIG. 3

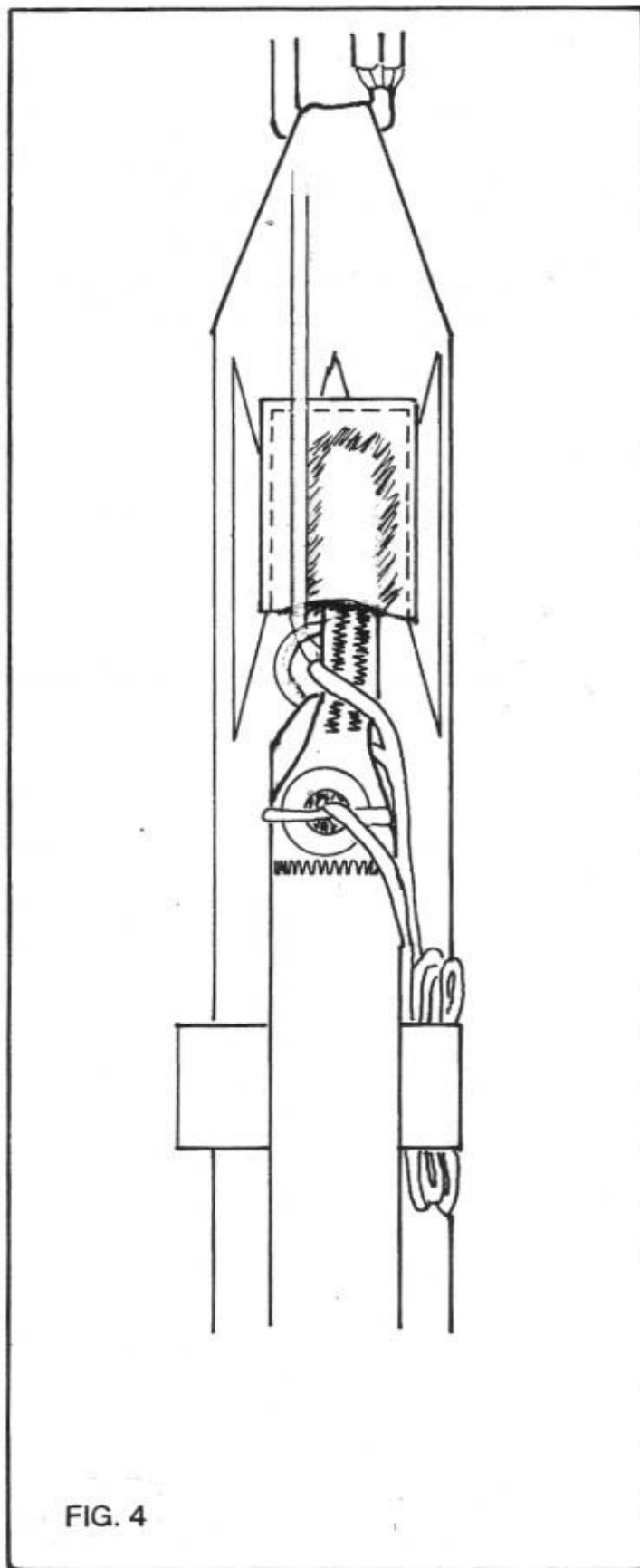
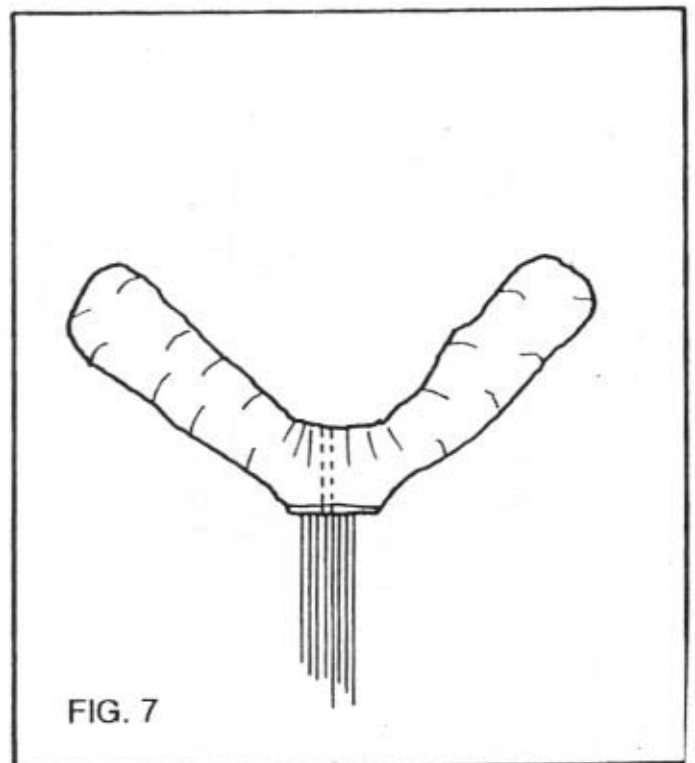
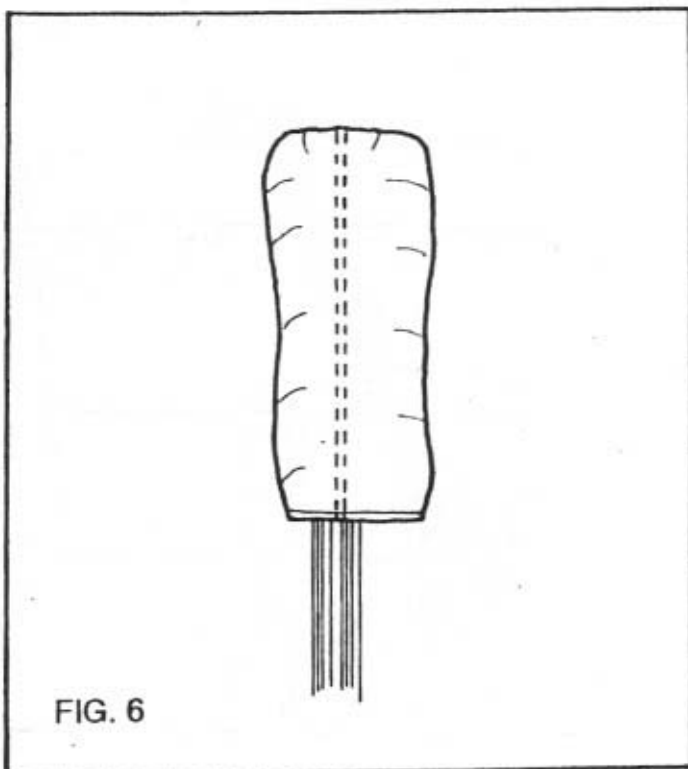
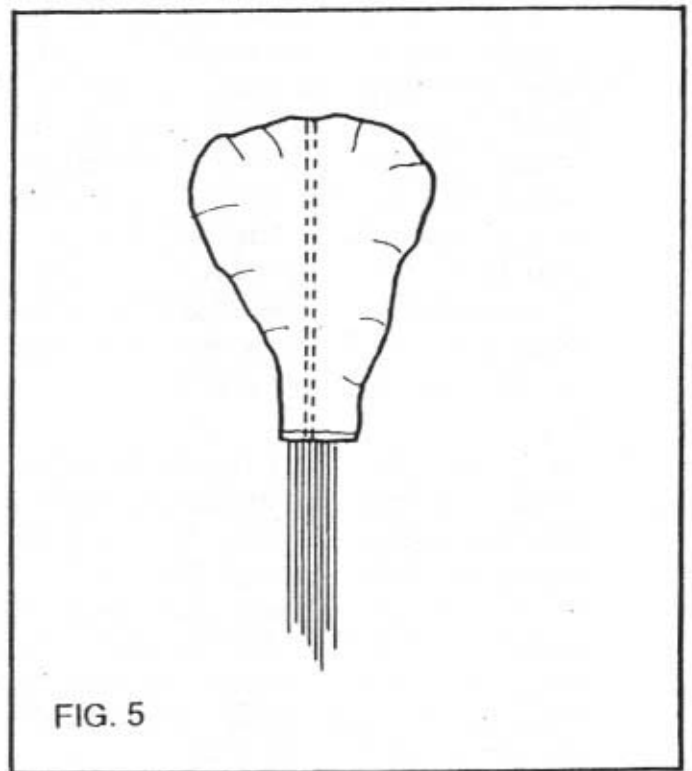


FIG. 4

Be sure the connector links are sufficiently tightened. A good rule-of-thumb is: "finger-tight plus a quarter turn with a wrench."

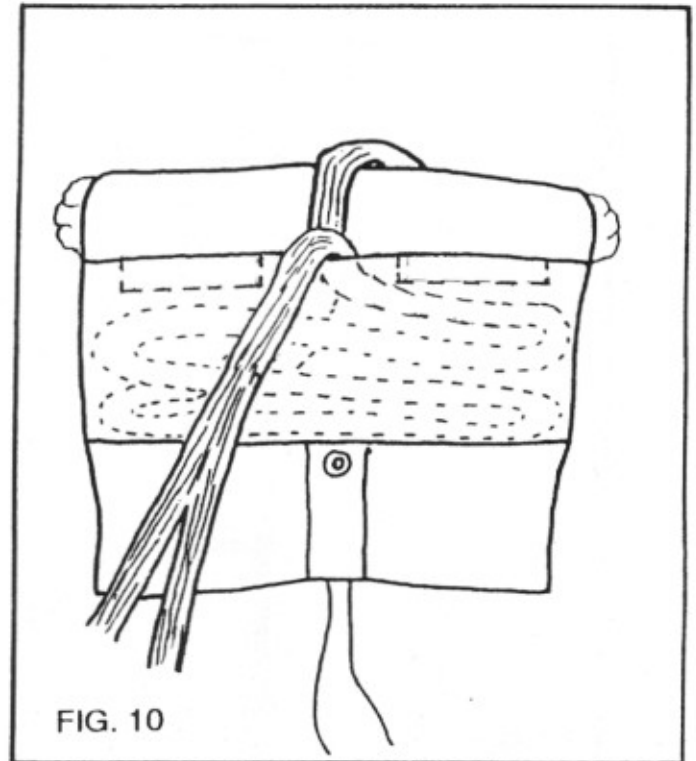
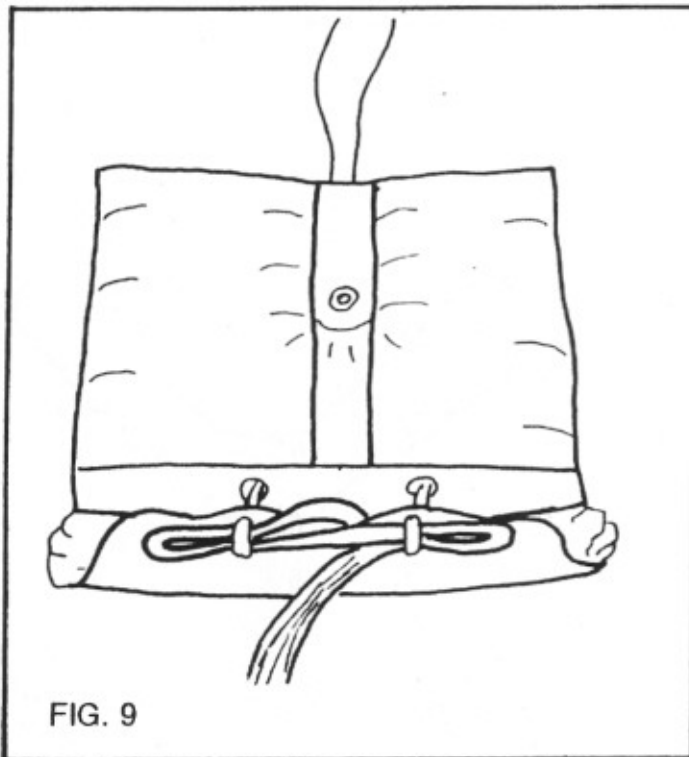
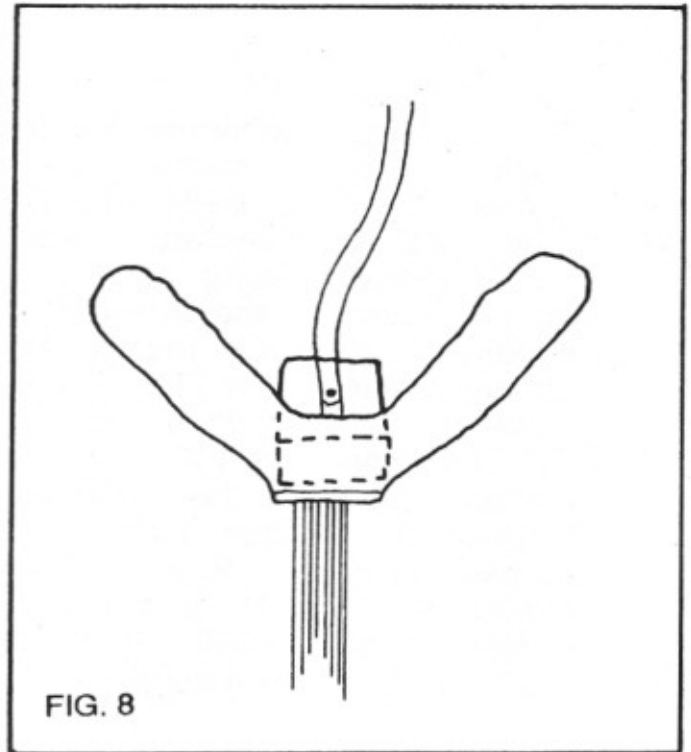
To set the deployment brakes, pull the control line downward thru the keeper ring until the brake-set loop is just below the ring. Insert the stiffened portion of the control toggle thru the loop to lock it into position, then insert the end of the stiffened portion up into the toggle pocket just above the keeper ring (FIG. 4). Now stow the slack in the velcro strap and secure the toggle to the velcro on the riser. (FIG. 4 shows the brake-set on the right side; the left brake-set will appear as a mirror image of FIG. 4.)

3) ALTICO recommends the "Pro-Pack" method of packing the reserve canopy, however, some manufacturers may still recommend the older "conventional" folding method. If the manufacturer of the ram air reserve canopy recommends the Pro-Pack, the canopy will look like FIG. 5 after it has been flaked. The conventional method will look more like FIG. 6. For either method, follow the manufacturer's instructions to this point, and then spread the canopy to either side of the center cell. Now compress and roll the center cell downward until it resembles the "V" shape shown in FIG. 7.

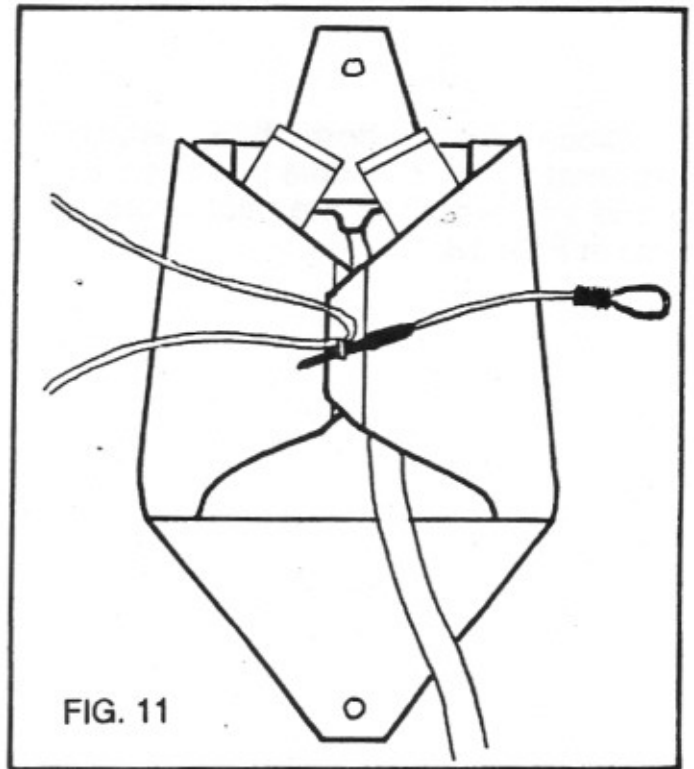


4) As shown in FIG. 8, place the reserve free bag under the "V" of the canopy, and push each half of the canopy up into its respective half of the bag. Be sure the slider is still up against the canopy as far as it will go. After the "ears" of the bag are stuffed, push the remainder of the canopy with the slider into the space at the bottom of the bag, and lock the bag with two stows of the suspension lines as shown in FIG. 9. Be sure that each stow forms a bight 2" to 3" long beyond the elastic.

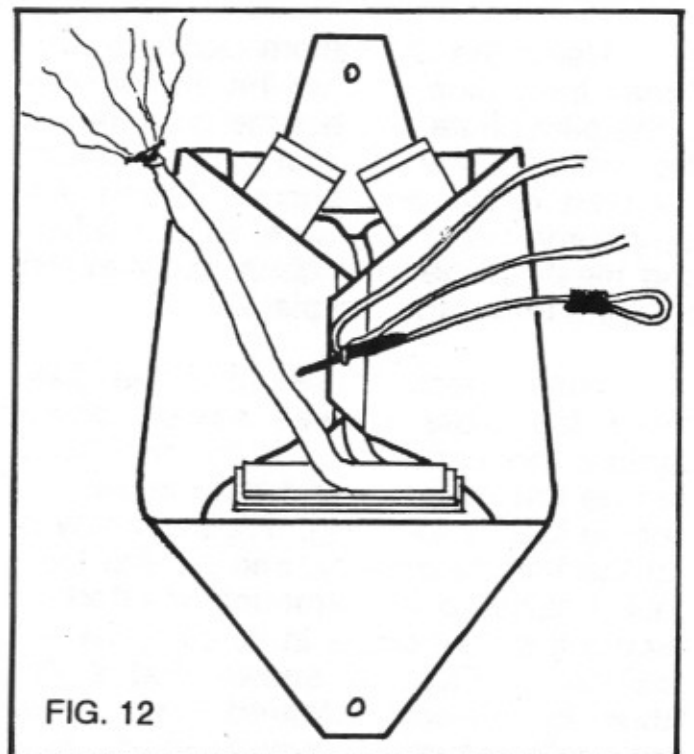
5) Turn the bag up on its top end and stow the remaining suspension lines in the line stow pouch. "S" fold the lines, using the full width of the pouch, leaving 6" to 12" between the bag and the connector links. Route the suspension lines out the narrow channel between the velcro closures of the line stow pouch as shown in FIG.10.



6) Lay the reserve risers into the reserve container so that they lie flat with no twists. The connector links should now be in the bottom corners of the container. Thread the pullup cord thru the reserve closing loop and then pass both ends up through the grommet in the free bag. Lay the bag into the reserve container so that the line stow pouch is on the underside, and the locking stows are toward the lower end of the container. Route the bridle out the bottom of the container and close the side flaps, either side first, securing with a temporary pin (FIG. 11). Leave the tuck flaps out until all but the top flap have been closed. They will be used then to help "dress" the container.

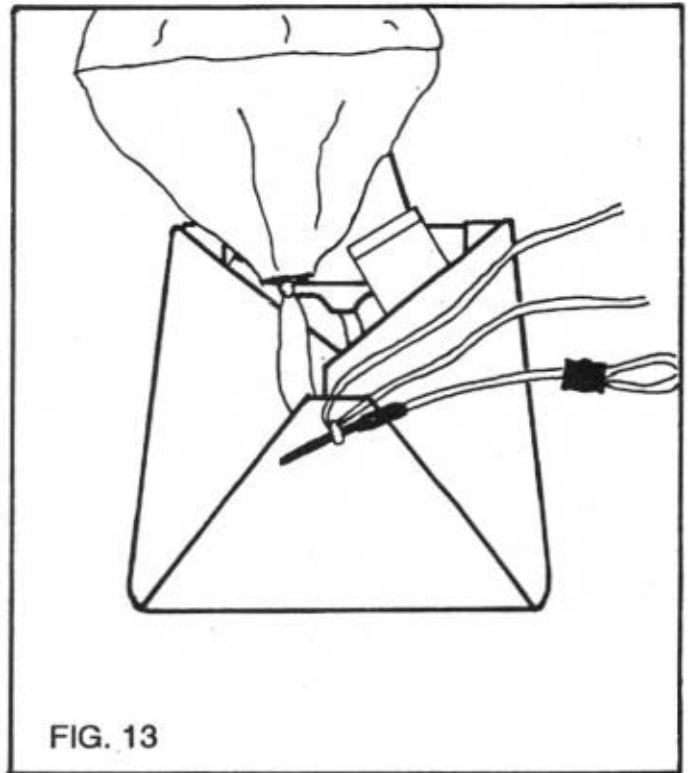


7) Fold the bridle in "S" folds between the side flaps near the bottom of the reserve container as shown in FIG. 12. Make the stows as wide as possible, but not so wide that any of the bridle would be exposed when the bottom flap is closed. *Be sure that none of the bridle is tucked under either side flap!* Tucking any bridle under a side flap would tend to retard the launch of the pilot chute.



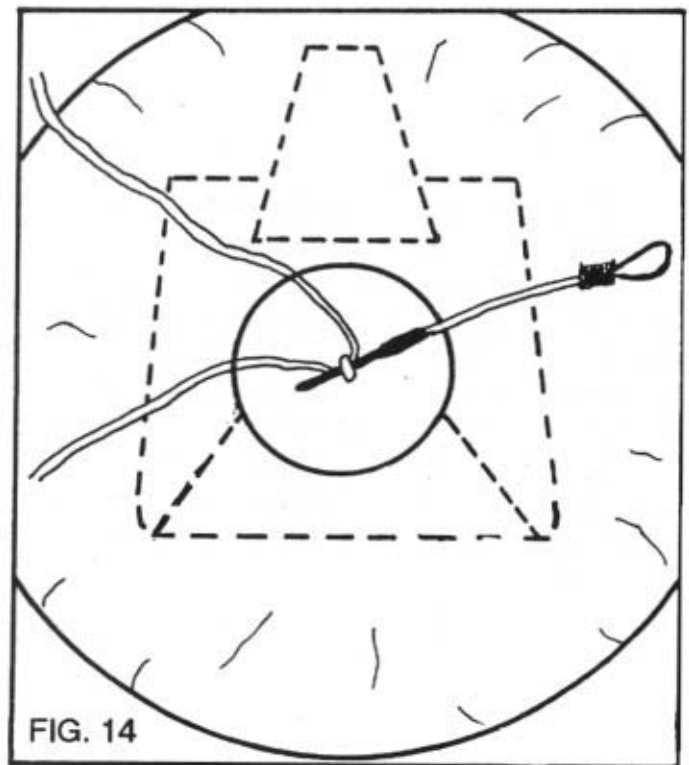


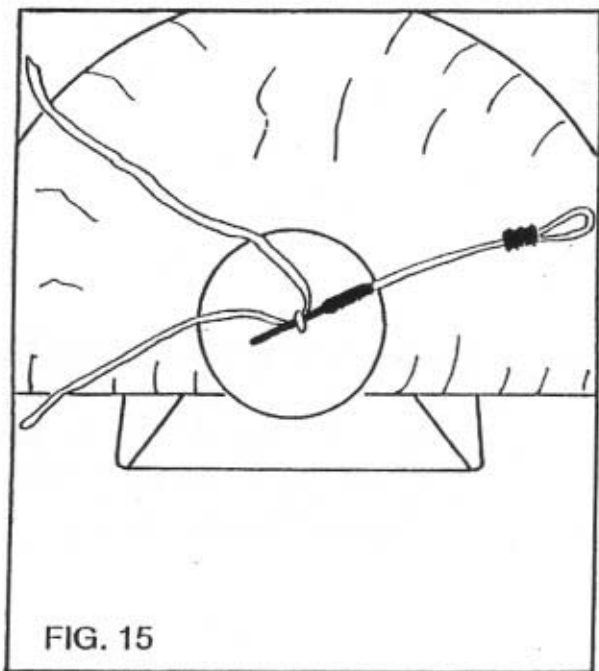
8) Close the bottom flap, leaving approximately 6" of bridle between the flap and the bottom of the pilot chute as shown in FIG. 13.



9) Using the .22 calibre cleaning rod, thread the pullup cord up thru the bottom of the pilot chute and out the grommet in the center of the top plate. Compress the pilot chute and secure it with the temporary pin. Be sure all the fabric and mesh of the pilot chute are cleared out from under the top plate.

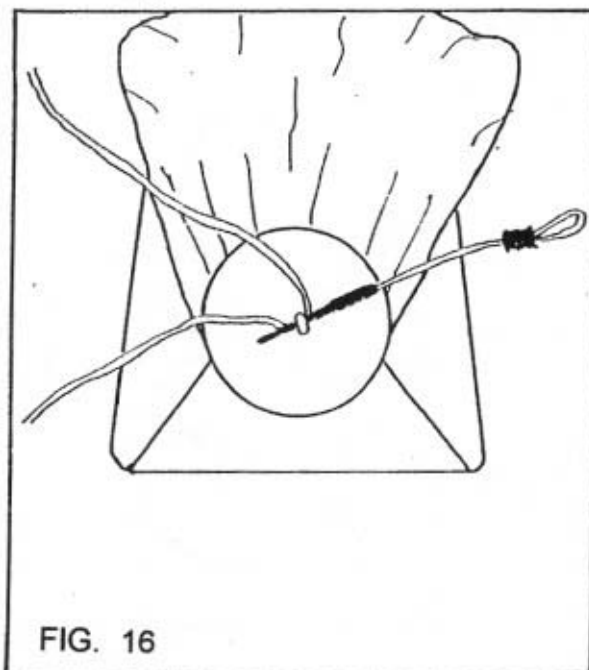
Now check to see that the pilot chute top plate is well seated down against the container. If the top plate can be rocked back and forth at all, the closing loop is too long. Riggers, now is not the time to be lazy; shorten the loop until it takes a fair amount of effort to secure the pilot chute in its compressed position. FIG. 14 shows that if the fabric is correctly cleared, the pilot chute will assume a circular shape and completely cover the reserve container.





10) Fold the lower edge of the pilot chute up under the top plate, forming a straight line as shown in FIG. 15.

Now work the pilot chute upward and inward into a "V" shape (FIG. 16).



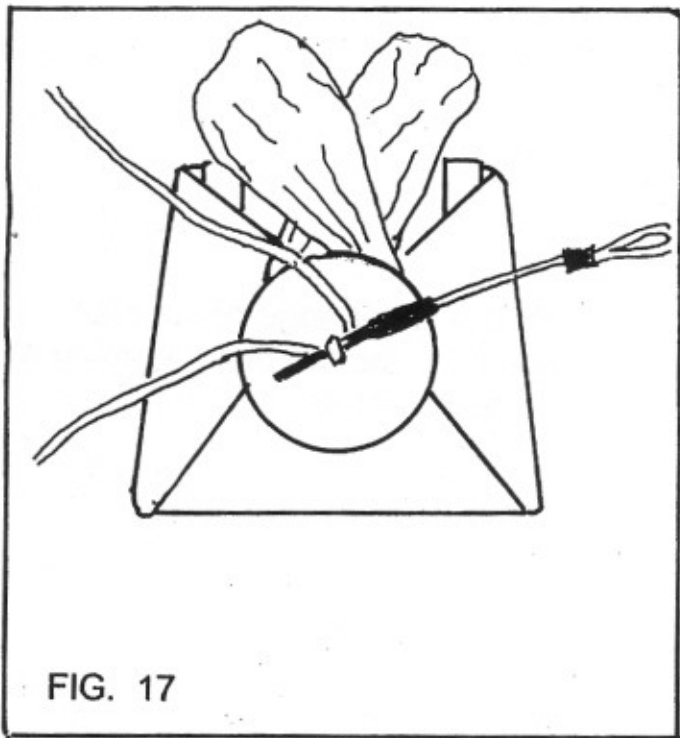


FIG. 17

The upper part of this "V" can now be given a half-twist, one side over the other as shown in FIG. 17. (This step will help prevent the fabric from shifting out from under the top plate.)

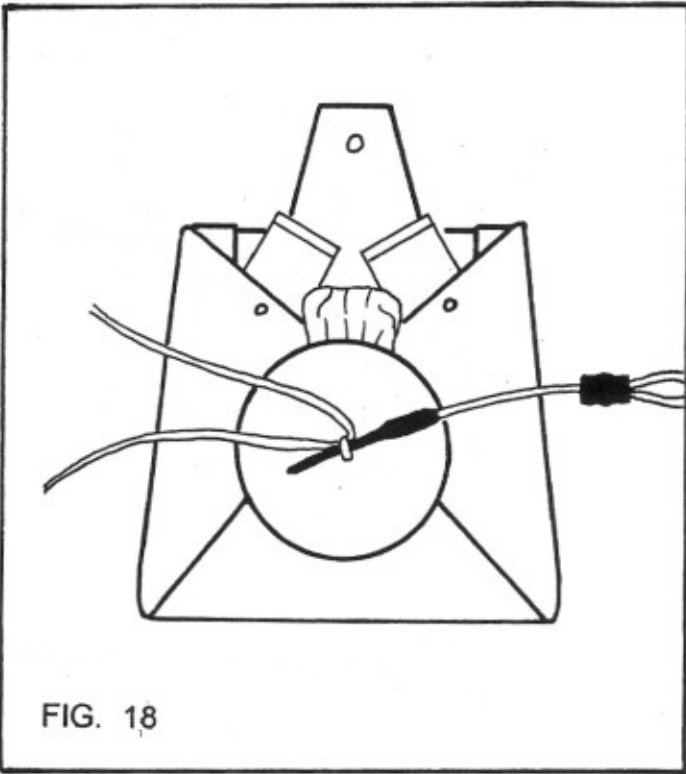


FIG. 18

FIG. 18 shows the fabric at the top being rolled and compressed, and partially tucked under the upper edge of the top plate. The remainder of the fabric will be covered by the reserve top flap.

11) Push the tuck flaps down over the reserve deployment bag. This will help dress the top of the container before closing the top flap. Now be sure that the reserve ripcord has been threaded thru its housing, and that the handle is in its velcro pocket inboard on the left main lift web just below the chest strap.

\*\*\*\*\*

*At this point, please read the section in this manual entitled THE RESERVE STATIC LINE (RSL). If it is decided that the RSL will be installed, continue with these instructions. If the RSL will not be installed, skip to step 12.*

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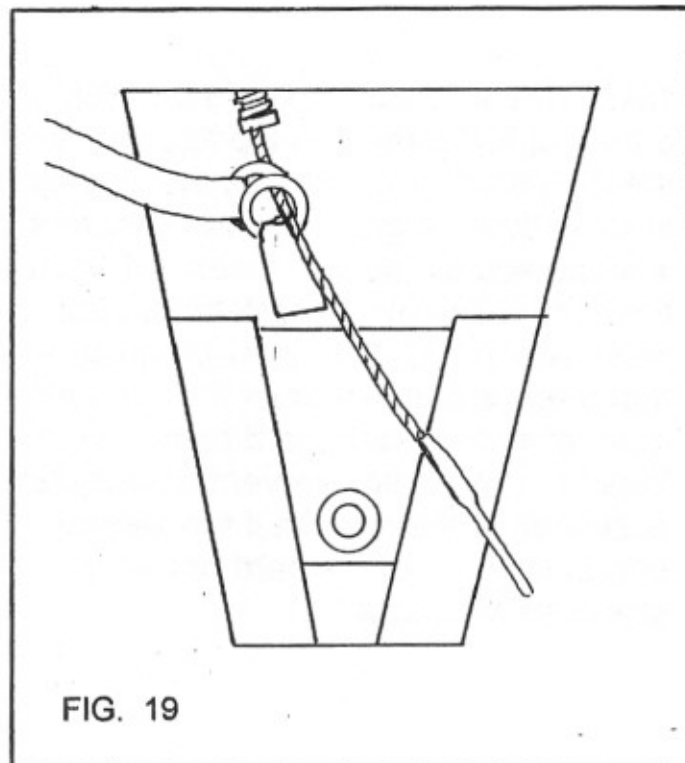


FIG. 19

Immediately after exiting the end of its housing, the reserve ripcord must pass thru the small ring on the end of the reserve static line(RSL), and then thru the same type of ring mounted on the reserve top flap (see FIG. 19). The velcro on the RSL should then be mated to the velcro track provided on the rear surface of the reserve left front riser. Route the RSL over the shoulder so that the end with the bronze snap-shackle exits from under the reserve riser just behind the main support ring of the harness. (See FIG. 20.) There should be about three to four inches of the RSL remaining so that when the DOLPHIN is assembled with a main canopy, the snap-shackle can be attached to the ring on the left main riser.

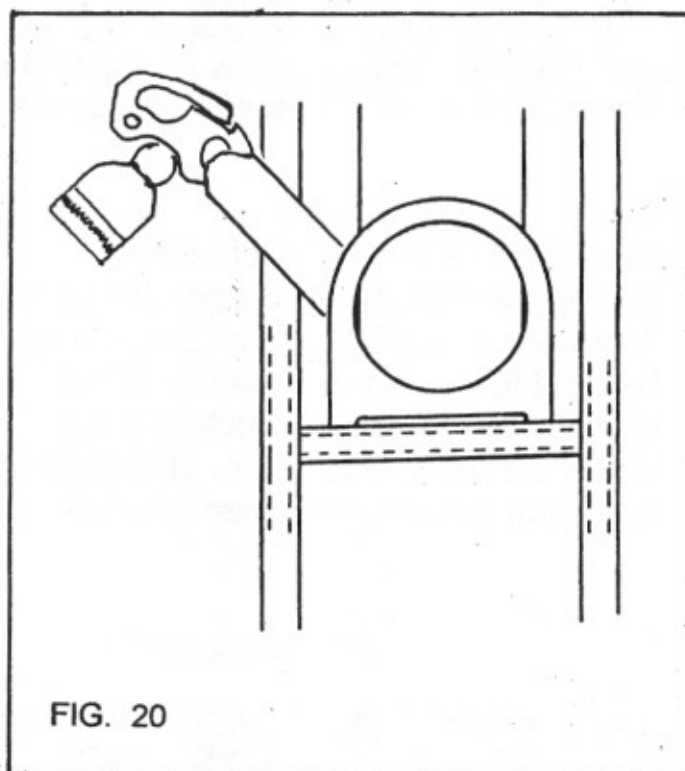


FIG. 20

12) Thread the pullup cord thru the grommet in the reserve top flap, remove the temporary pin, then pull the closing loop up thru the grommet and secure it with the actual ripcord. Insert the end of the ripcord pin into its protective pocket as shown in FIG. 21. Now check to see that there is a minimum of 2" or a maximum of 4" of extra ripcord cable at the handle. (This helps prevent an accidental activation of the reserve if the wearer bends forward, or if a hard opening stretches the harness.)

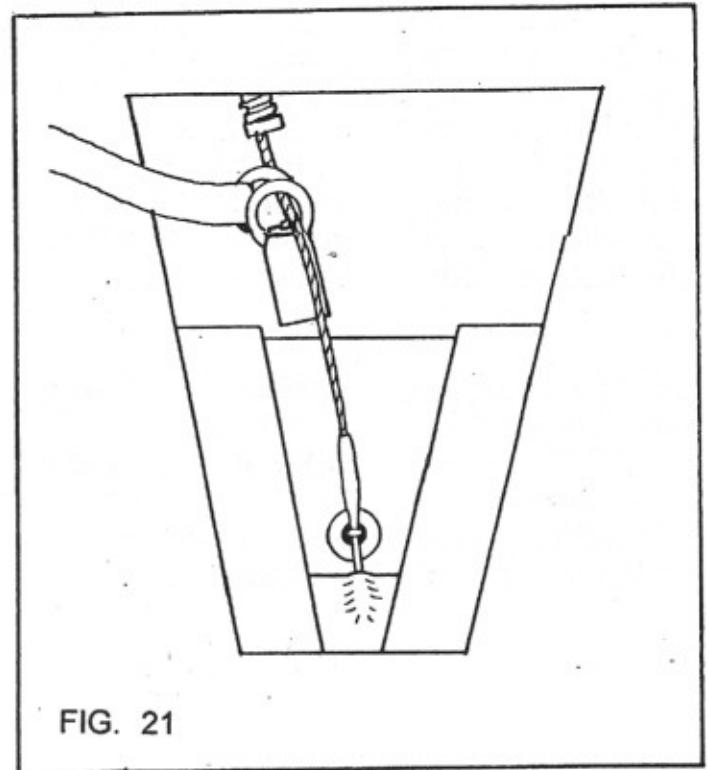


FIG. 21

13) Install a rigger's seal and log the pack job on the packing data card. Slide the packing data card into the pocket on the underside of the reserve pin cover.

14) Close the reserve pin cover, routing the RSL out the upper left corner. Any slack in the RSL may now be stowed by tucking it down into the top of the reserve container or by tucking it back under the reserve top flap. The reserve container should now resemble FIG. 22.

***IMPORTANT !!!***

THE RIGGER MUST ACCOUNT FOR ALL TOOLS AT THIS TIME TO ASSURE THAT NONE HAVE BEEN LEFT IN THE PARACHUTE.

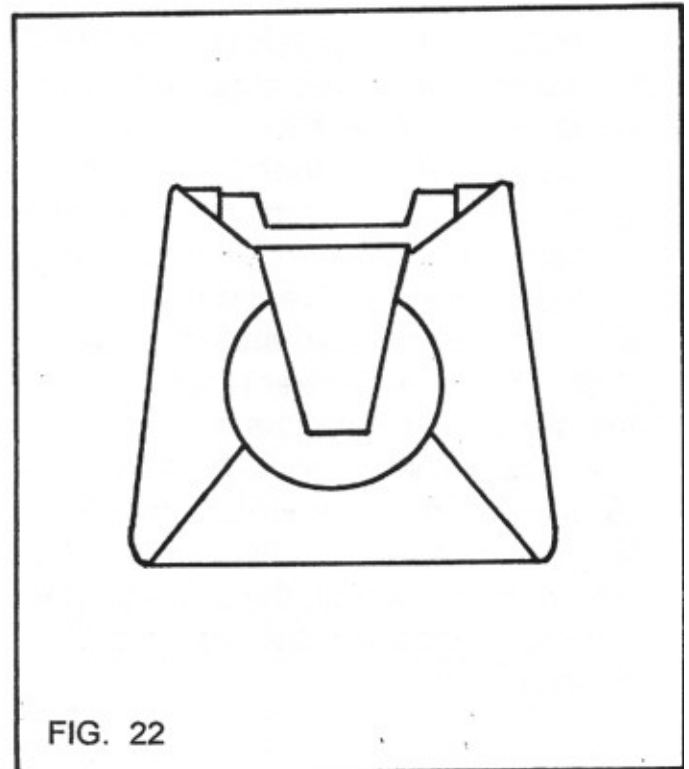


FIG. 22

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## THE RESERVE STATIC LINE

Back in the late 60's and early 70's a system was devised for opening a chest-mounted reserve container "automatically" after disconnecting from a main canopy in the air ("cutting away"). Called the "Stevens System" (after its inventor), it was simple and effective, consisting of a lanyard attached at one end to a main riser and at the other end to the reserve ripcord handle. However, many "experienced" jumpers were reluctant to continue using the Stevens System after they were off student status. The system was highly visible and in some cases rather bulky, and it labeled the wearer as a "student" or "novice" jumper.

In the years since it was first introduced, the Stevens System has undergone many variations, and so many refinements have been added (including adaptation to the present "piggy-back" type of parachute rig) that it is now simply known generically as the "Reserve Static Line" or "RSL" for short. It is still simple and effective, and in most cases there is little or no added bulk.

The DOLPHIN features an RSL which is unobtrusive from the front, and completely invisible from the back. A jumper need not worry about appearing to be a student or novice while wearing the DOLPHIN RSL.

A study of parachuting fatalities over the past fifteen years reveals a significant percentage which resulted from a cutaway followed by no reserve deployment or by reserve activation too low for deployment. Many of these could have been prevented by the use of an RSL. For this reason the RSL is a standard feature on all DOLPHIN harness/container systems. During the design and testing of the DOLPHIN, the live tests of the RSL resulted in consistent activation of the reserve within 3/10 of a second after cutaway.

However, In some special instances it may not be desirable to have an immediate activation of the reserve right after a cutaway, and accordingly the DOLPHIN features an RSL which may be instantly disabled by disconnecting the snap shackle where it attaches to the left main riser. All it takes is a tug on the red ribbon attached to the snap shackle, and the RSL is disconnected.

The following are two scenarios in which the jumper may decide not to use the RSL:

- 1) The jumper intends to perform Canopy Relative Work (CRW). If an entanglement ("wrap") between jumpers occurs, it may be better to be sure that the jumper has fallen clear of the wrap after cutting away before opening the reserve. In this case the jumper may decide to disable the RSL before boarding the aircraft.
- 2) While under canopy, it becomes apparent that the ground winds have increased considerably. The jumper decides that after landing, he or she will cutaway the main canopy to avoid being dragged. The RSL may be disconnected prior to landing to avoid unnecessary activation of the reserve.

There may be several other scenarios in which the jumper may elect to disable the RSL, and this should always be the jumper's personal decision after collecting as much information from qualified sources as possible

It should be emphasized here that the RSL is *not* an "automatic opener" or an automatic activation device. It will not operate unless the main canopy is cutaway, and the cutaway must occur at sufficient altitude for deployment of the reserve. The RSL is only a backup, and should not be relied upon to deploy the reserve. It is designed not to interfere in any way with manual activation of the reserve, and at most sport parachute training centers, it is standard practice to train students to ignore the presence of the RSL and to manually pull the reserve ripcord in an emergency situation.

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## INSTRUCTIONS FOR ASSEMBLING AND PACKING A MAIN PARACHUTE CANOPY INTO THE DOLPHIN HARNESS/CONTAINER SYSTEM

Assembling and packing a main canopy into the DOLPHIN harness/container system must be accomplished by the manufacturer, or by an FAA Senior or Master Rigger, or by the person who will make the jump with the parachute being packed.

- 1) Carefully inspect all components of the main canopy, following the canopy manufacturer's directions:
  - a) Throwout pilot chute and bridle
  - b) Deployment bag
  - c) Main canopy
  - d) Suspension lines
  - e) Connector links
  - f) Risers
  
- 2) Attach the canopy to the risers and be sure that the connector links are sufficiently tight. A good rule-of-thumb is, "finger-tight plus a quarter-turn with a wrench." Assembling the canopy to the risers should be done by a rigger or by someone who is qualified to do so by experience with parachute equipment.
  
- 3) Attach the risers to the harness/container system according to the chapter in this manual entitled "THE 3-RING RELEASE SYSTEM."

### **!! WARNING !!**

The main container of the standard skydiver's DOLPHIN is designed exclusively for use with a *throwout* pilot chute. A spring-loaded pilot chute is very likely to cause a total malfunction. Do not attempt to use a spring-loaded pilot chute in the main container of a DOLPHIN harness/container system unless the DOLPHIN is a Student Model.



4) All main ram air canopies are furnished with a bridle attachment point at the center of the upper surface. This consists of either a metal ring or a loop of tape or webbing. To attach the pilot chute, bridle and deployment bag to the main canopy, pass the loop end of the bridle down thru the grommet in the top of the bag as shown in FIG. 1. Then pass the loop thru the bridle attachment on the top of the canopy (FIG. 2). Now pass the pilot chute and bag thru the loop in the end of the bridle and pull the loop tight as shown in FIG. 3. (An easy alternative method of attachment is to simply use a connector link.)

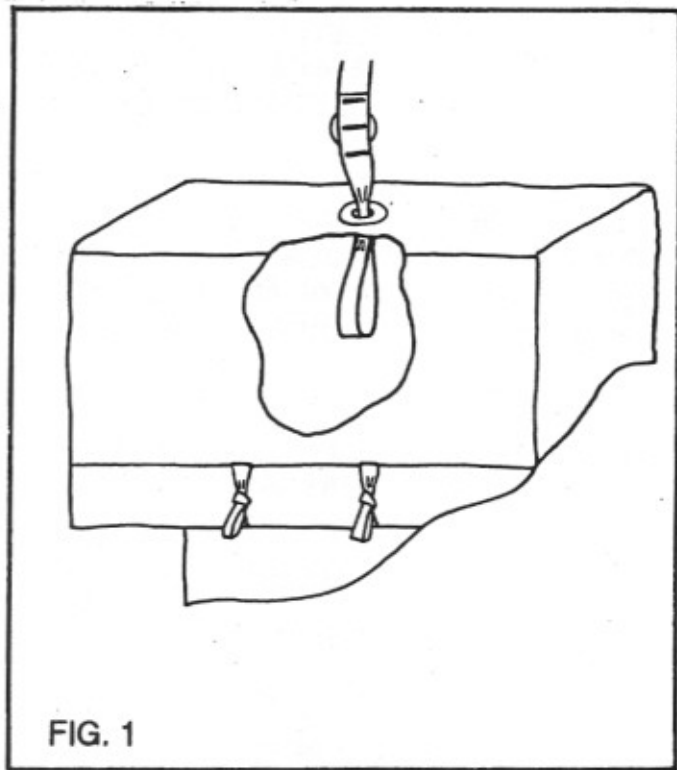


FIG. 1

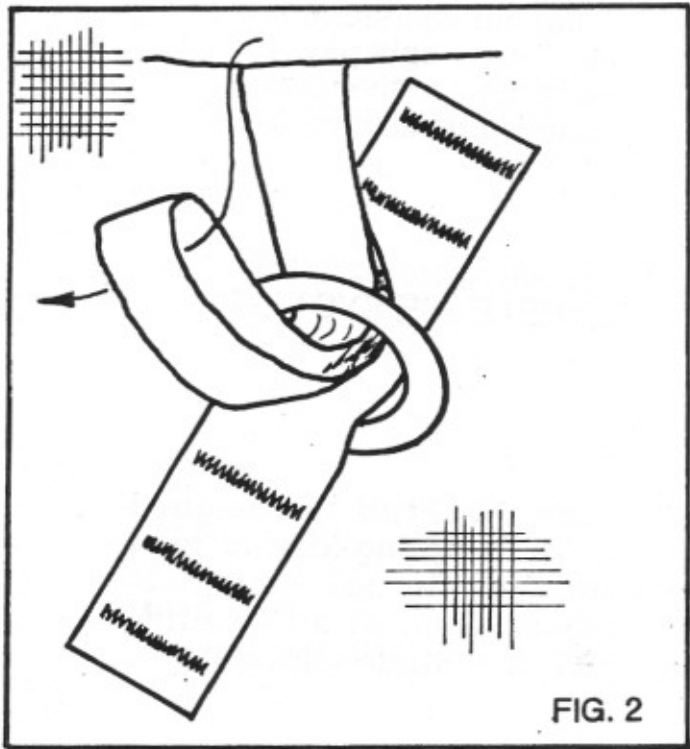


FIG. 2

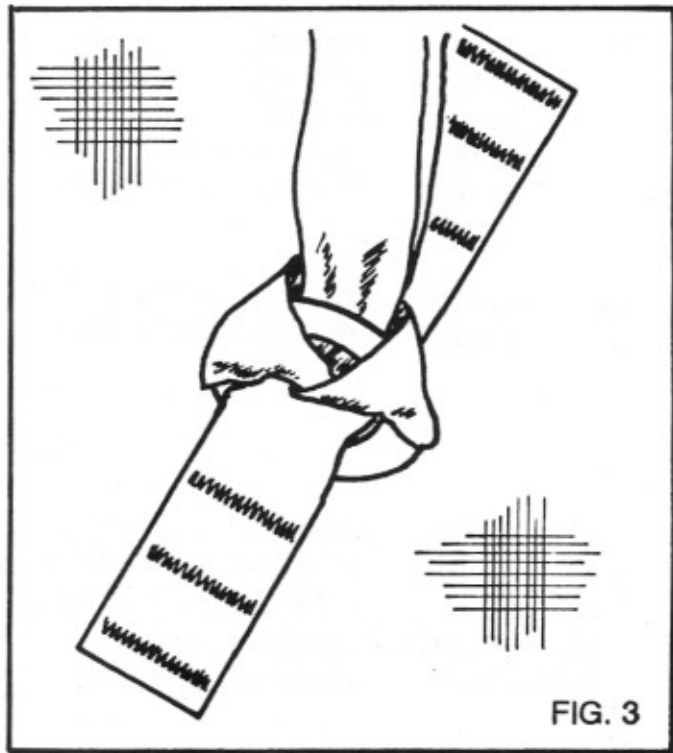
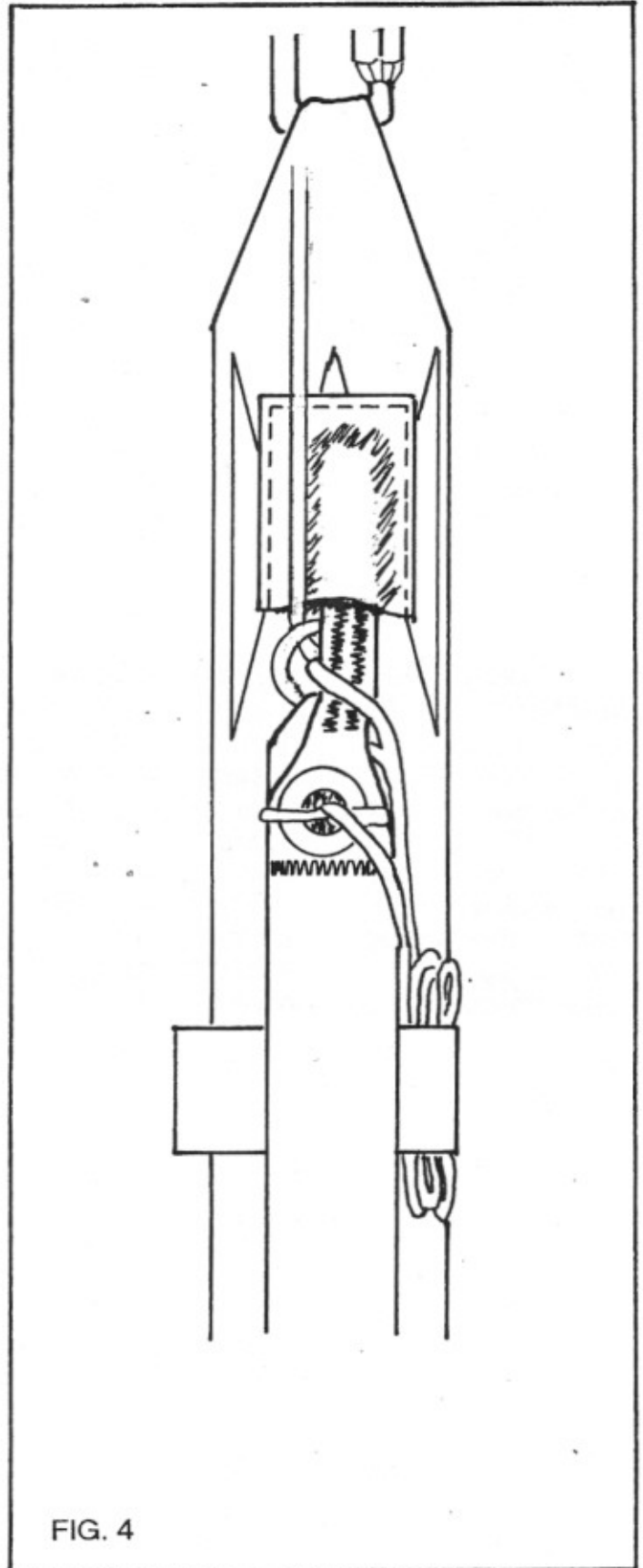


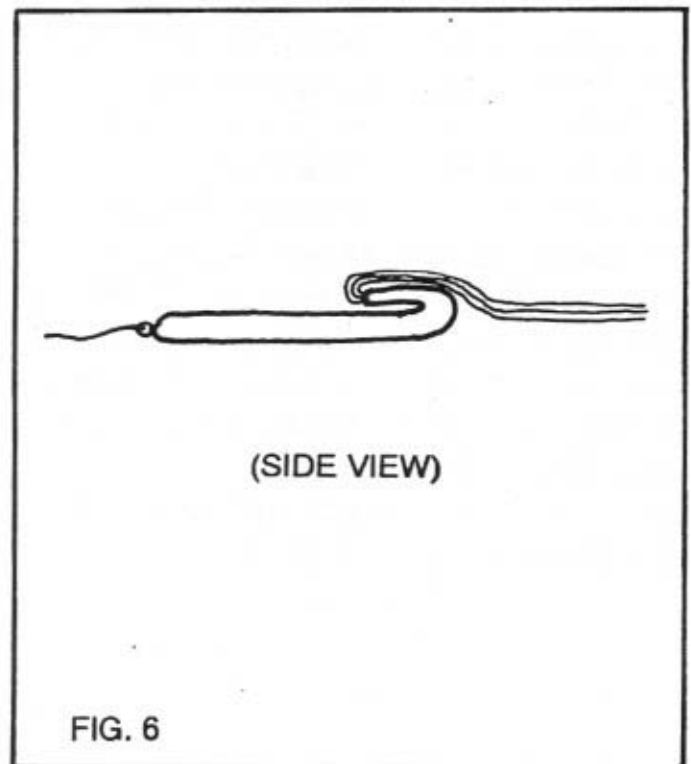
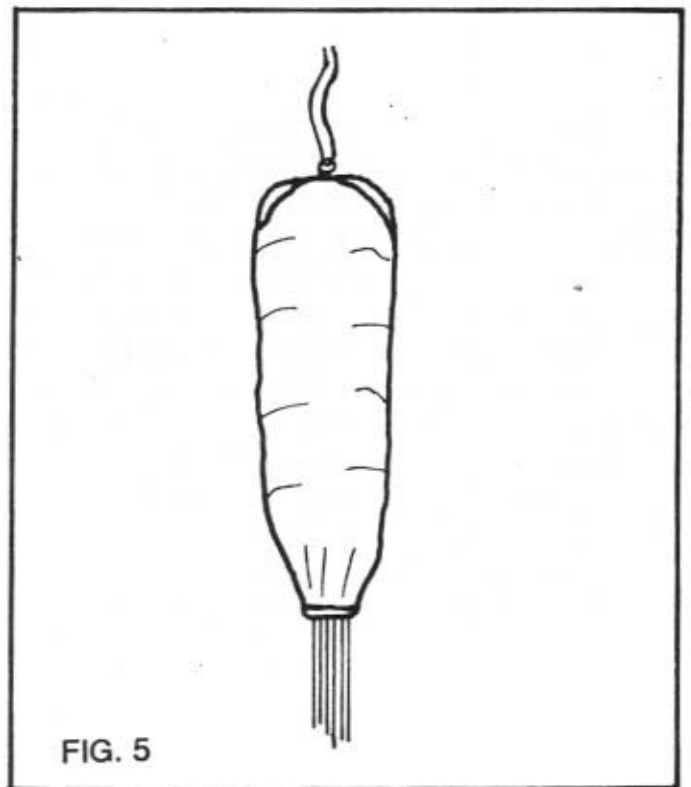
FIG. 3

5) Check the continuity of the suspension lines to assure that each line goes from its attachment point on the canopy down thru the slider grommet to its respective connector link without passing under or thru any other line. Be sure that each control line is clear from its attachment on the trailing edge of the canopy down thru the slider grommet and thru its respective guide ring on the rear riser. Each control line must be *securely* attached to its control toggle. For a simple and effective way to do this, see pages 6-8 of this manual.

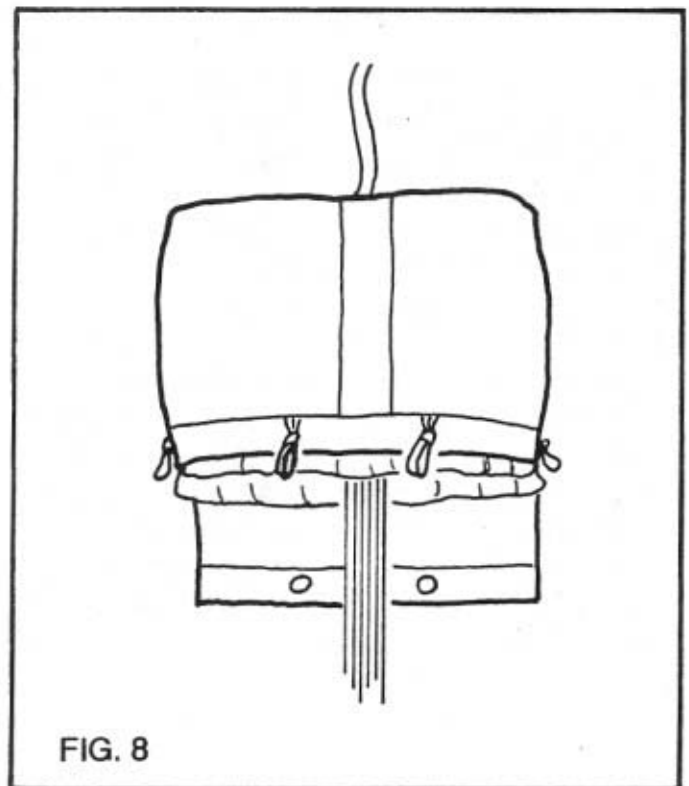
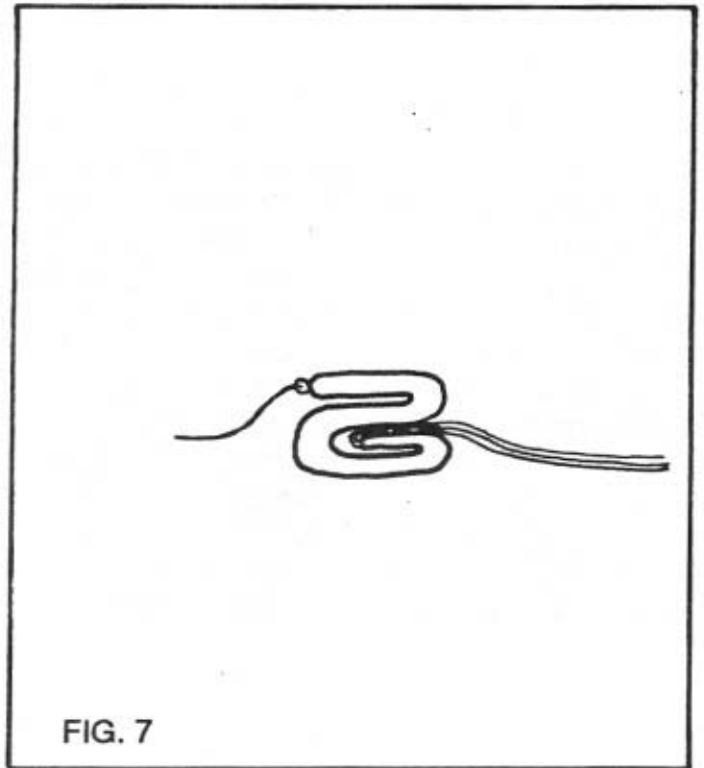
6) Set the deployment brakes by pulling each control line downward until the brake-set loop is just below the guide ring on the riser. Push the stiffened portion of the toggle thru the brake-set loop, and then up into the toggle pocket just above the guide ring. The slack in the control line should then be "S" folded approximately 2" long and stowed in the piece of loop velcro provided. Secure the control toggle to the hook velcro on the riser. The right brake-set should resemble FIG. 4; the left one will appear as a mirror image of FIG. 4.



7) Follow the canopy manufacturer's directions for flaking and folding the main canopy. When the canopy resembles FIG. 5, the slider should be all the way up against the canopy as far as it will go, and the stacked canopy should be approximately 3" wider than the deployment bag. Grasp the lower end of the canopy with the suspension line group and make a fold 8" to 10" up onto the canopy as shown in FIG. 6.



"S" fold the rest of the canopy on top of the first fold (FIG. 7), then stuff the folded canopy into the bag. Be sure the bridle is pulled out the top of the bag and that no canopy fabric is trapped inside the bag between the metal ring and the grommet in the top of the bag. Try to fill all the corners of the bag so that the bulk of the canopy is evenly distributed. See FIG. 8.



8) At the front of the mouth of the bag are two loops on which rubber bands should be installed. These are the "Locking Stows". Push each rubber band thru its respective grommet in the bag's closing flap, and close the bag by making a stow in each elastic with the suspension lines as shown in FIG. 9.

*Be sure that these two elastic bands are always in good condition !!* If the locking stows break during deployment, an out-of-sequence condition may occur which could result in a malfunction.

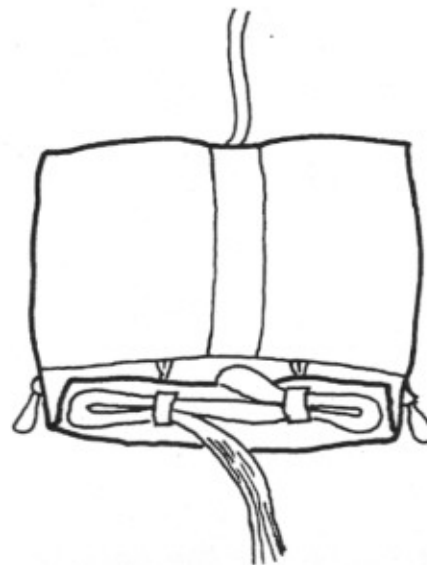


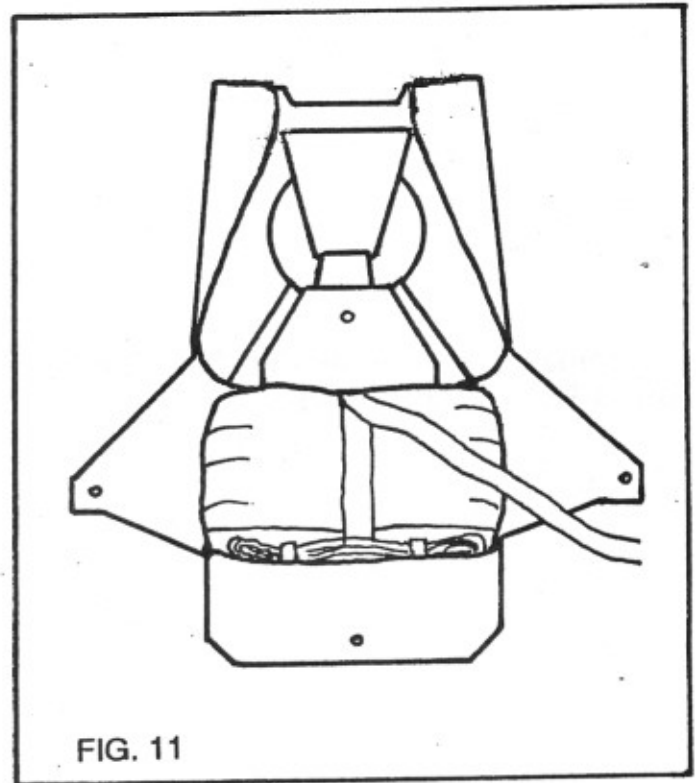
FIG. 9

9) Stow the rest of the suspension lines in the elastic bands which have been installed in the loops at each side of the bag. It has become common practice to "double-stow" these line stows by wrapping each band around the lines twice for a better grip. Experience does indicate that deployments are more consistent and better staged when the lines are double-stowed. However, *do not double-wrap the locking stows*. After stowing the lines as described, the bag should look like FIG. 10, and there should be 10" to 12" of lines unstowed between the last stow and the risers.

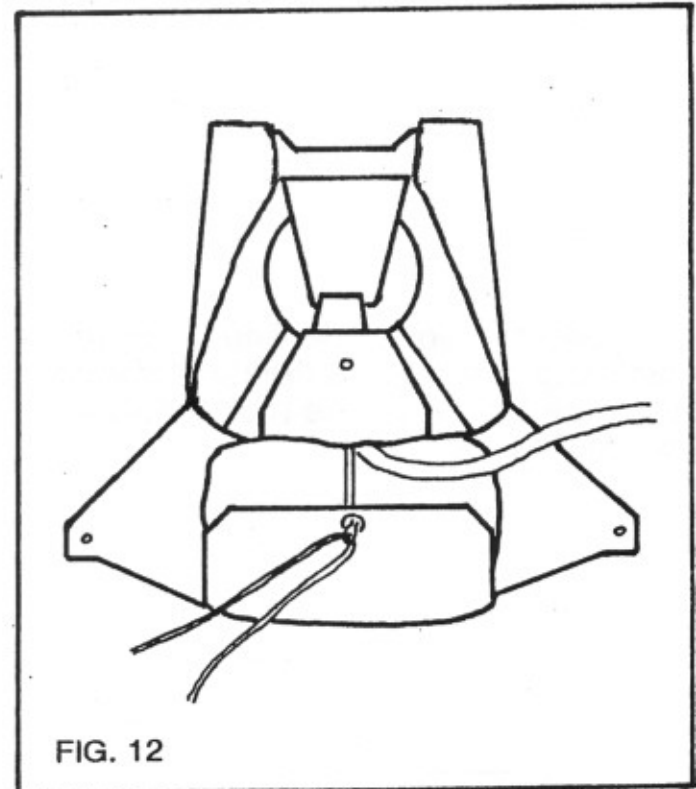


FIG. 10

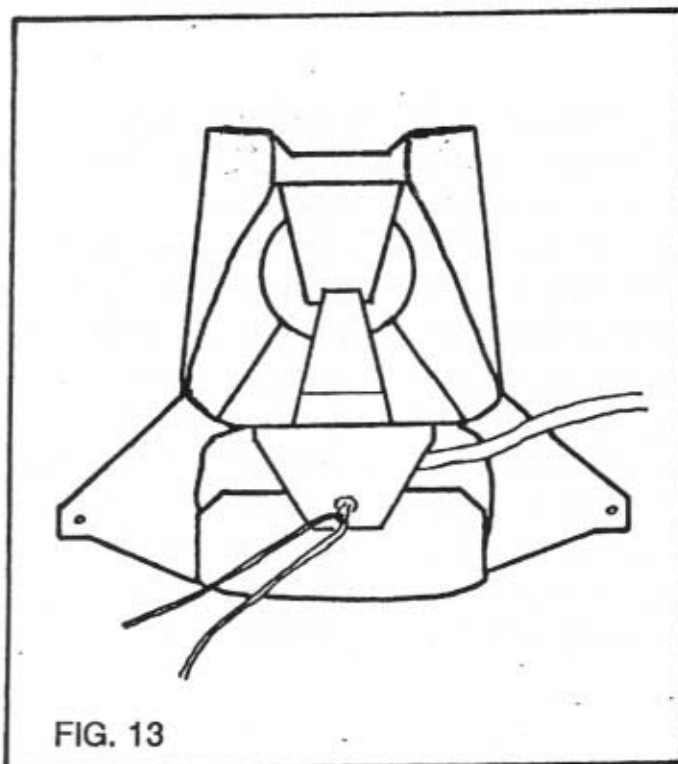
10) Insert the pullup cord thru the container locking loop, then lift the bag straight back over the reserve container and set it in the main "pack tray". Lay the main risers flat against the sides of the reserve container and close the riser covers over them. (In early models of the DOLPHIN the riser covers are closed with metal snaps; later models feature a tuck-tab closure. The "DOLPHIN 2000", introduced in April 1998, features full-length riser covers over the shoulder, secured with a velcro closure.)



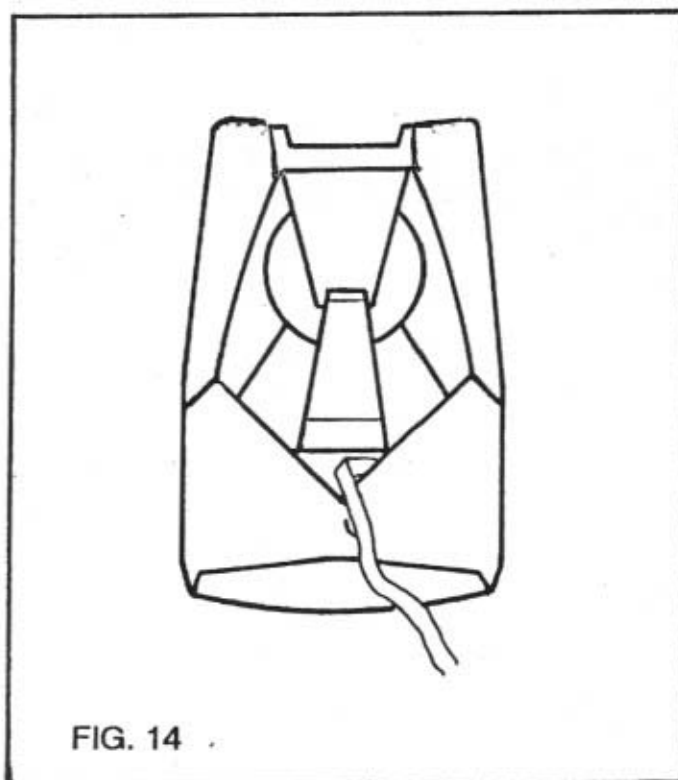
11) Lay the bridle out to the right and close the bottom flap (see FIG. 12.)



12) Keeping the bridle to the right, close the top flap (FIG. 13).



13) Close the right side flap, then the left side flap, and secure the pack closed with the curved pin on the main bridle as shown in FIG. 14.



14) Mate the small patch of velcro just above the curved pin on the main bridle to the corresponding patch in the center of the main top flap as shown in FIG. 15. This is important because it assures that the pilot chute has enough slack to withdraw the pin.

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*If your DOLPHIN is equipped with a pilot chute pouch on the right leg strap, continue with Step 15a. If your pilot chute pouch is on the bottom of the main container, skip to Step 15b.*

\*\*\*\*\*

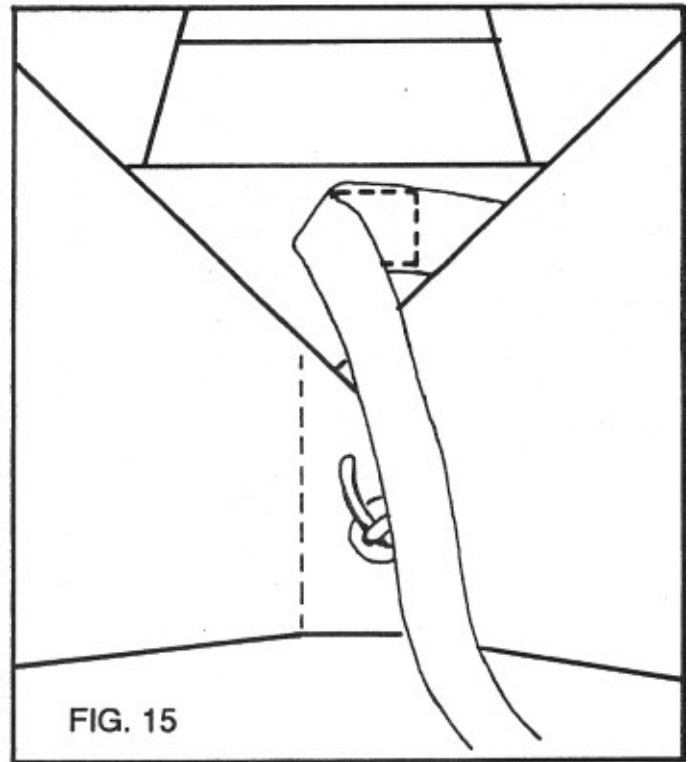


FIG. 15

15a) [For pilot chute pouch on right leg strap]. Mate the velcro on the bridle to the velcro track provided near the lower edge of the right side flap. This will lead the bridle along the container to the harness near the mouth of the pilot chute pouch. There will be some slack in the bridle between the curved pin and the velcro track. Tuck this slack up under the lower edge of the right side flap as shown in FIG. 16. (Skip Step 15b and go to Step 16.)

15b) [For pilot chute pouch on bottom of container]. Tuck some of the bridle up under the lower edge of the right side flap, similar to what is shown in FIG. 16, but simply let the bridle exit from the lower right corner of the container. (Continue with Step 16.)

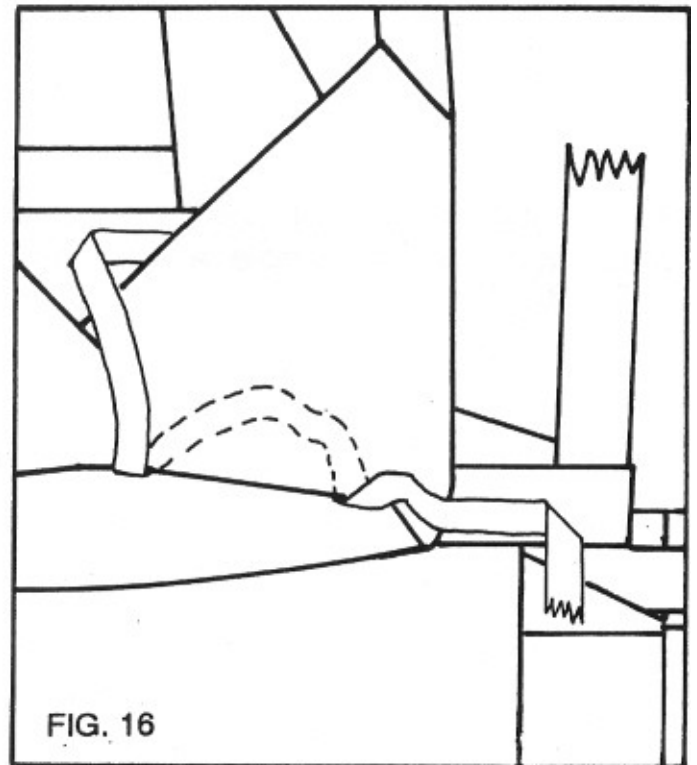
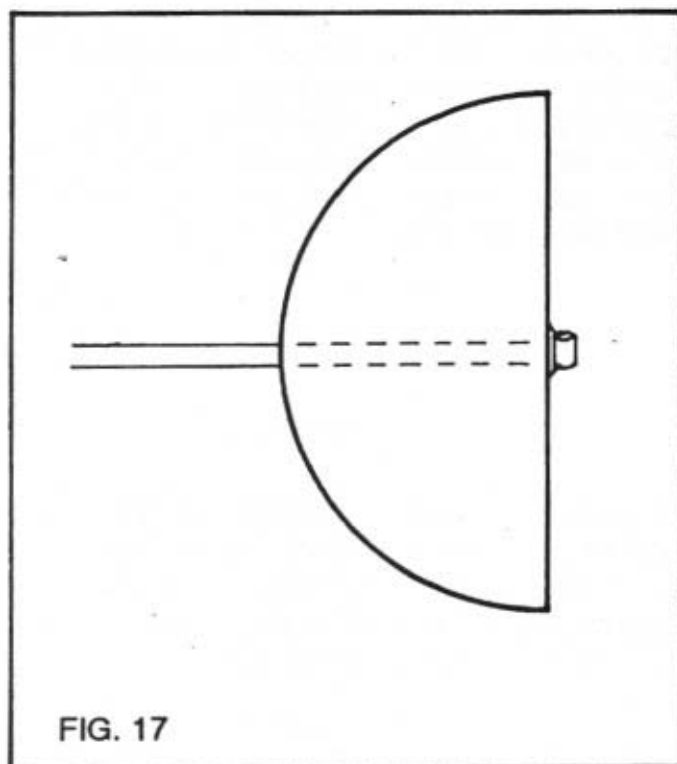


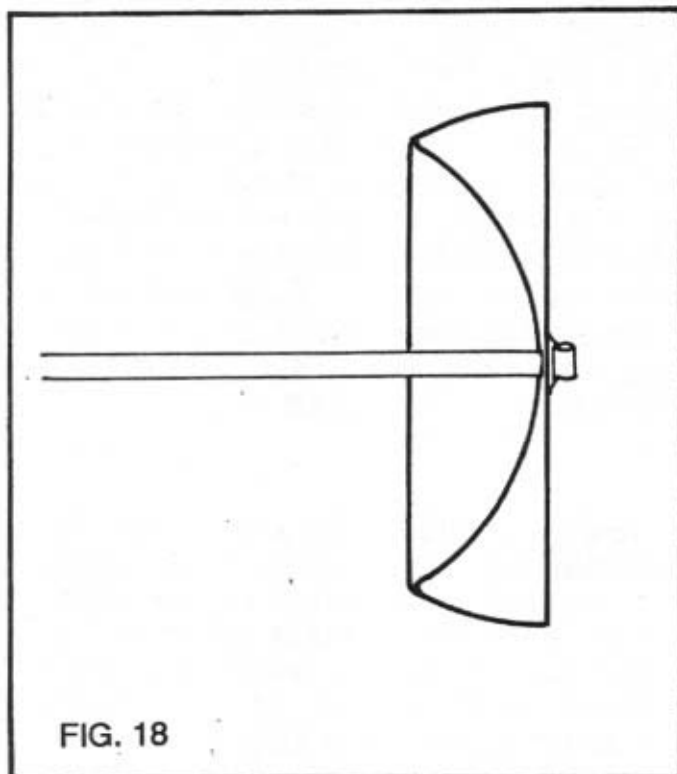
FIG. 16



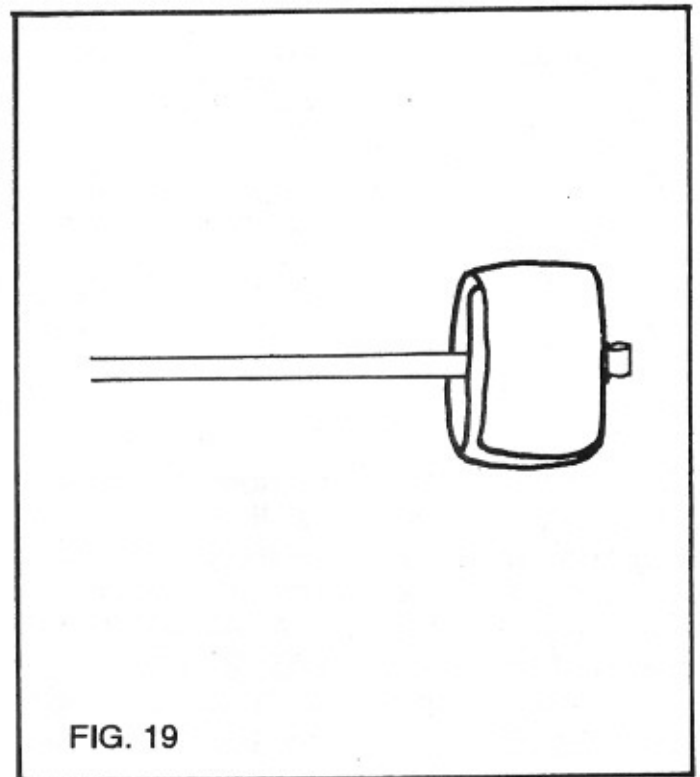
16) Lay the pilot chute out in a full circle with the mesh side up and fold it in half with the mesh on the inside as shown in FIG. 17.



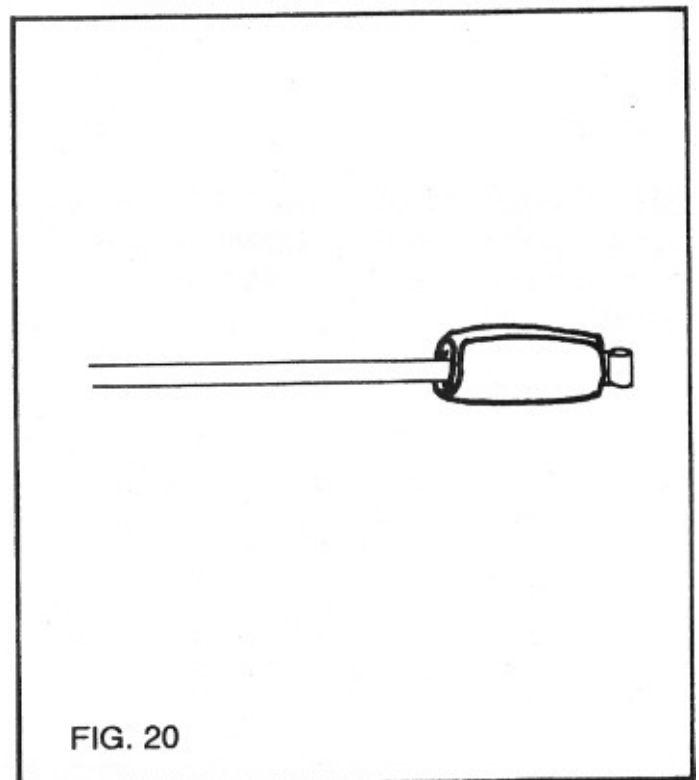
17) Fold the curved edge up to the attachment of the handle as shown in FIG. 18.



18) Fold the pilot chute in thirds as shown in FIG. 19.



19) Roll the pilot chute as tightly as possible so that it resembles FIG. 20.



20) Using one or two fingers, push the bridle into the pouch a little at a time until none of the bridle is exposed. Then stuff the rolled pilot chute into the pouch until only the handle is visible at the mouth of the pouch. FIG. 21 shows the pilot chute in the pouch on the right legstrap; FIG. 22 shows the pilot chute in the pouch on the bottom of the container. *Do not push the handle all the way into the pouch; that makes it difficult to find when you need it.*

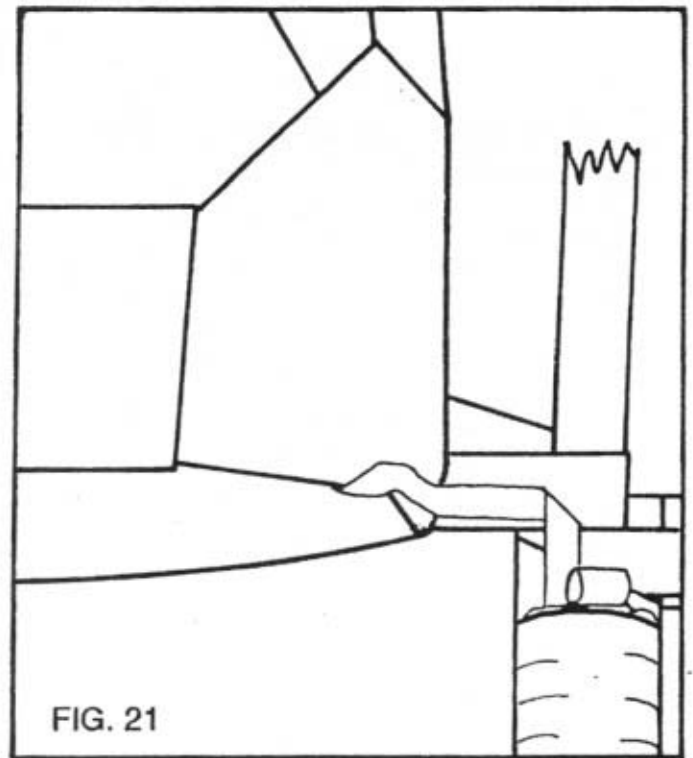


FIG. 21

21) Close the pin cover and secure it by wrapping its end down around the end of the top flap and mating the velcro.

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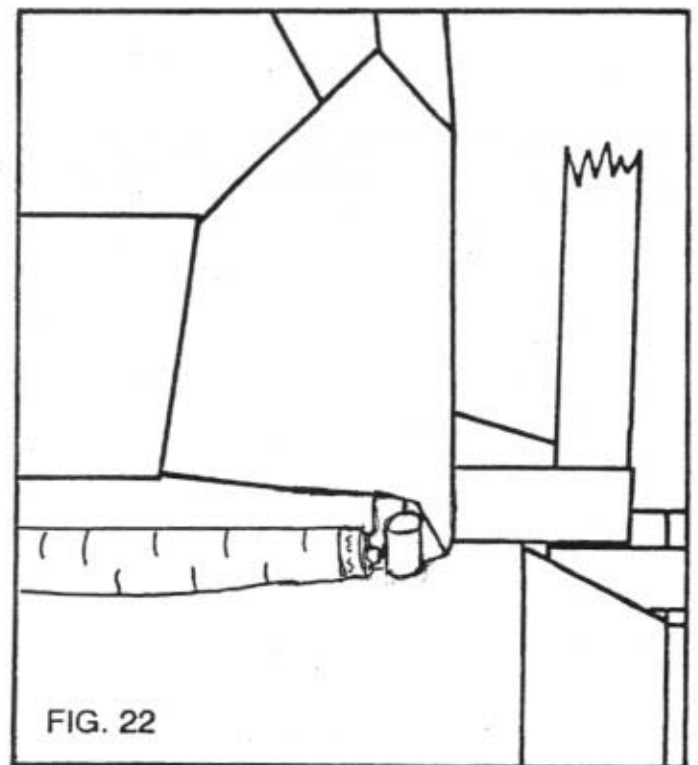


FIG. 22

# THE 3-RING RELEASE SYSTEM

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(This section reprinted courtesy of The Relative Workshop Incorporated)

## INTRODUCTION

The 3-Ring Release System was invented by the Relative Workshop in 1976. It was the first practical release that allowed parachutists to jettison their canopies in one motion by simply pulling a single handle.

Not only is the 3-Ring easier to operate than previous canopy release systems, it is also more reliable.

Once the main canopy is jettisoned, the only things left on the harness are two smooth rings that cannot snag a deploying reserve. Some other release systems can--and have--interfered with the deploying reserve.

## MODIFYING THE 3-RING RELEASE

The great reliability of the 3-Ring system results from the proper functioning of every one of its individual components. Therefore, the owner should not modify the system in any way, nor should he replace genuine 3-Ring parts with others.

These modifications (among others) may cause the system to not work properly:

- \* Substituting risers that don't have Type 2 sheathing for the locking loop. Don't use risers that have loops made of Kevlar or solid cord.

- \* Not using a breakaway handle with cable with the special yellow coating. This Teflon-impregnated coating is important; other plastic coatings may cause the cables to bind in the housings or loops, making it difficult or impossible to jettison the risers.

- \* Using a breakaway handle with cables of the wrong length. The length of the cables is critical to insure each riser releases in the proper sequence. Replacement handles are available from ALTICO.

The 3-Ring Release is used on the DOLPHIN under license from the Relative Workshop.

## GETTING TO KNOW THE 3-RING

Knowing how the 3-Ring Release works will help you assemble and inspect it properly.

Begin by peeling the release handle from the Velcro on the harness. Peeling, rather than pulling, makes it easier to separate the handle from the webbing.

Look behind the risers near the harness and observe the movement of the yellow cable as you pull the handle. When the cable clears the white loop, the release is disengaged.

Now slowly pull one of the risers off the harness. As you pull, you'll notice that the white loop gets pulled through the grommet by the action of the smallest ring.

Each ring forms a lever with a ten-to-one mechanical advantage as it passes through the other. A force of 1,000 lbs. on the large harness ring exerts a force of only ten pounds on the white loop. (Opening shock usually totals about 1,000 lbs., or 500 lbs. on each riser.)

Because of the mechanical advantage provided by the 3-Ring design, only a force of approximately a pound on the top ring keeps the release together.

That's why it's important to keep foreign matter like bits of grass and sticks out of the 3-Ring assembly. A small stick in the white loop could prevent a riser from releasing.

It is also important to understand one of the properties of the nylon components of the system.

When nylon stays in the same position for a long time it begins to conform to that position, or take a "set." If the 3-Ring Release system stays assembled for too long, the nylon can become so stiff that the low drag from a malfunction (such as a streamer) won't pull the riser off the rig.

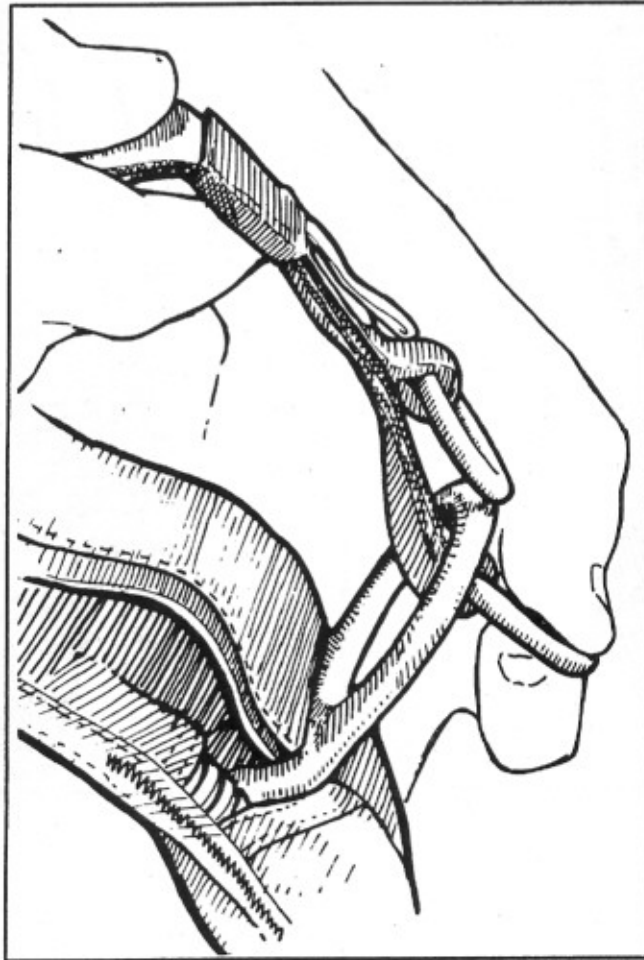
The 3-Ring Release system must be disassembled, flexed and inspected every month. Procedures for this are listed in the following care and maintenance chapter of this manual.

## ASSEMBLY

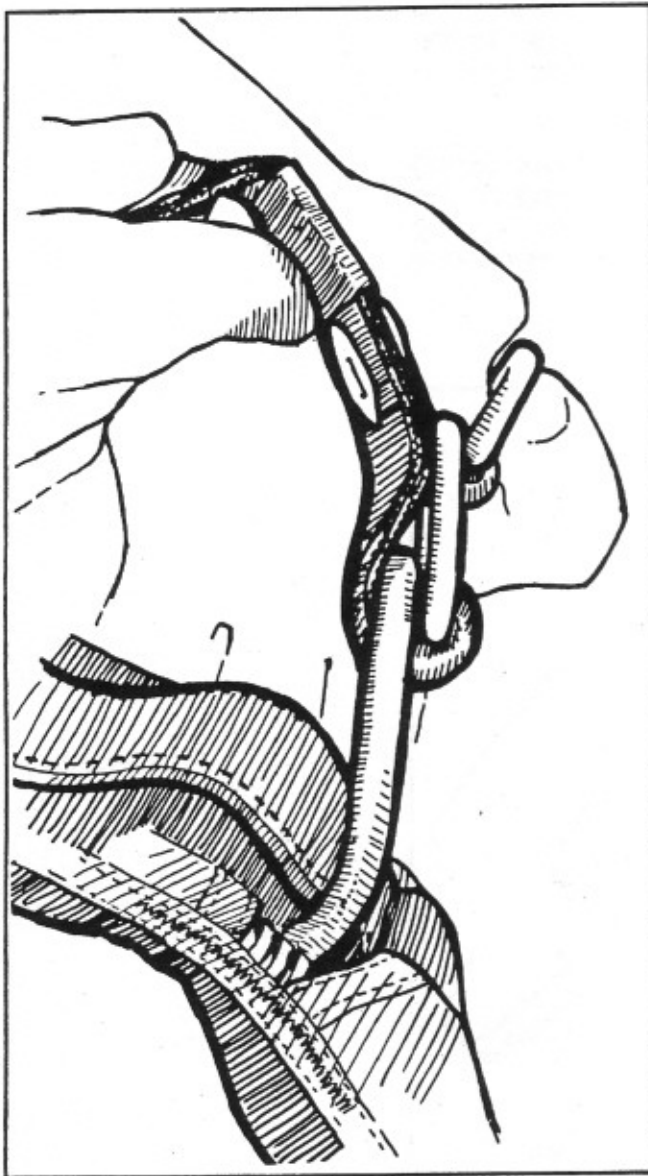
Before assembling the 3-Ring release, make sure the risers aren't twisted or reversed. Lay the DOLPHIN face down, as you would to pack it.

1. Thread each cable into its housing and stick the handle to the harness. The handle should be positioned as close to the ends of the housings as possible so that no cable is exposed.

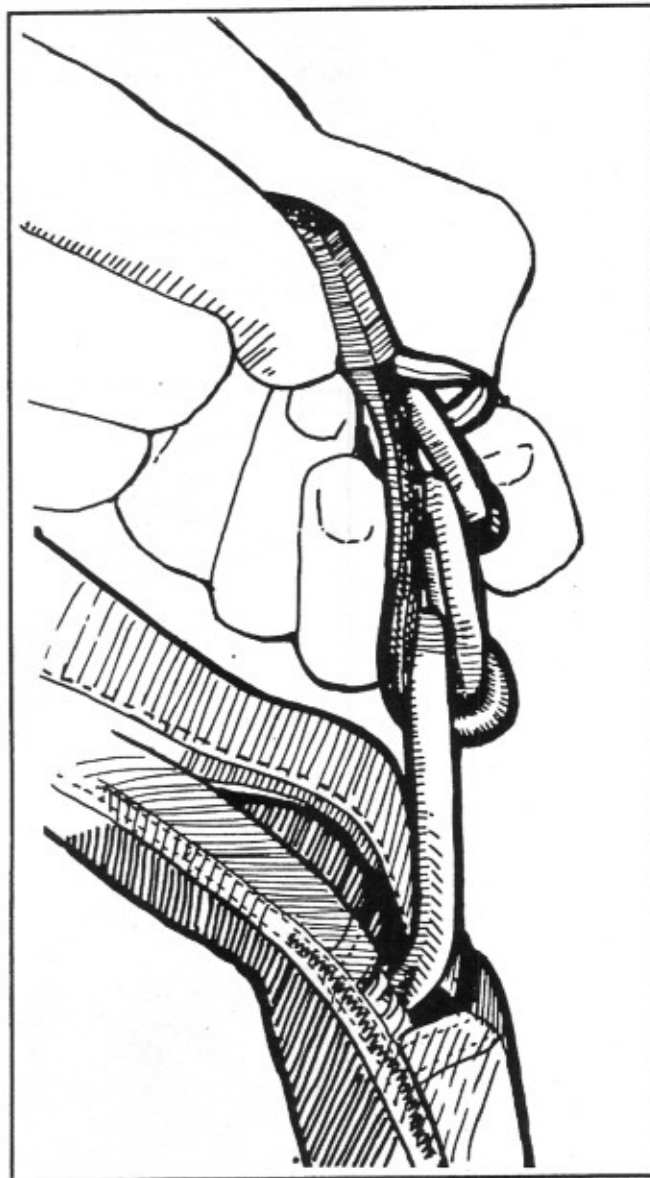
2. With the rings of the riser facing toward the floor, pass the middle ring on the end of the riser through the large harness ring from above. Fold it back toward the canopy and risers.



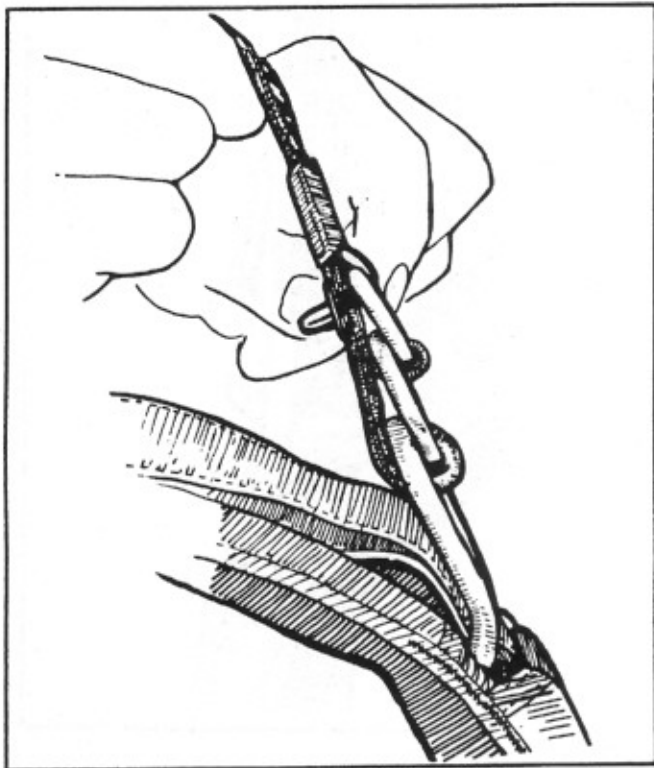
3. Thread the smallest ring through the middle ring in the same way, but make sure it doesn't pass through the large ring.



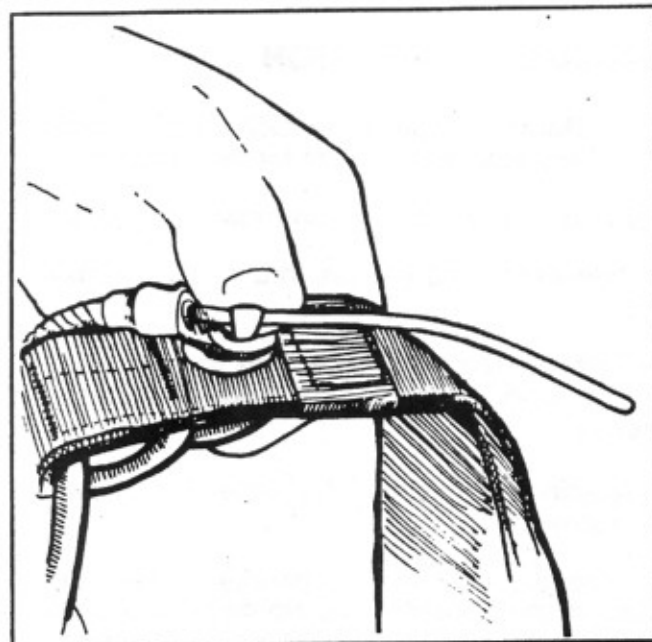
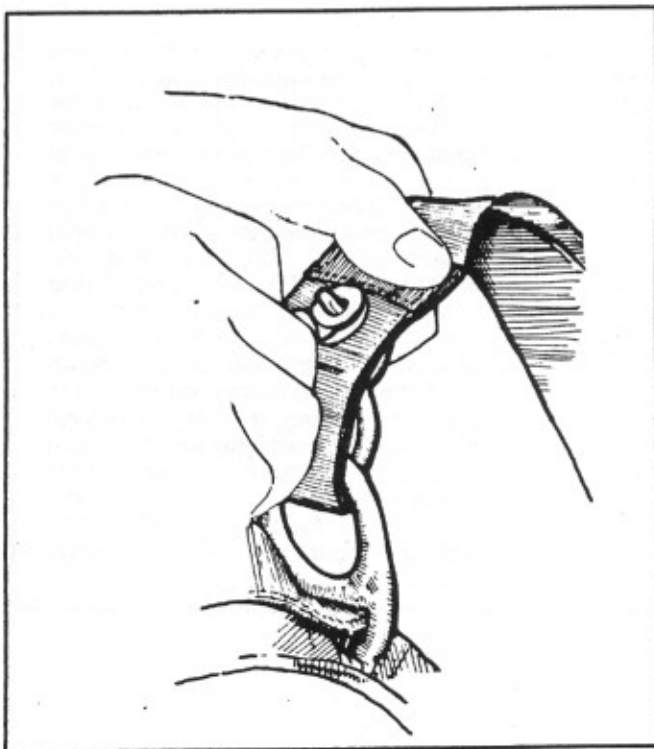
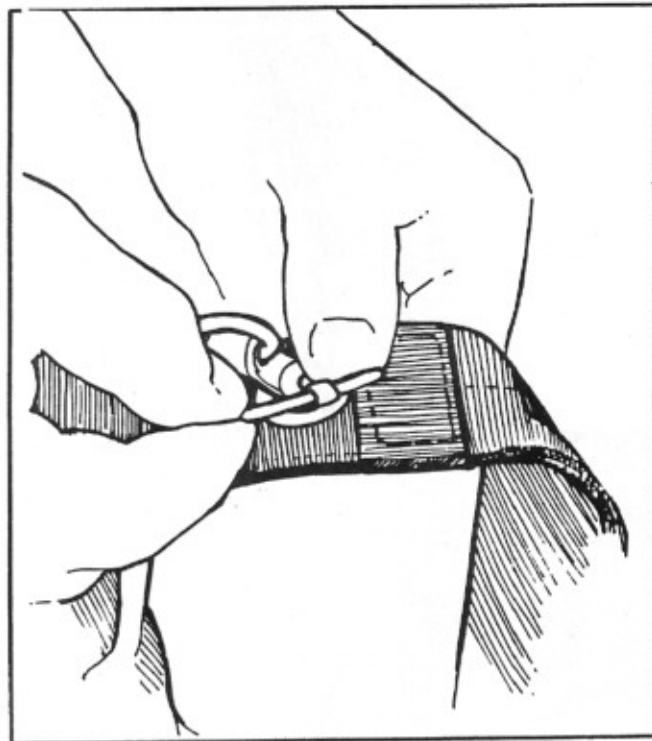
4. Bring the white loop over the smallest ring only and then through the riser grommet so it pokes out the back of the riser.



5. Continue threading the white loop through the grommet on the end of the cable housing. The flat side of the cable housing grommet should be against the riser.

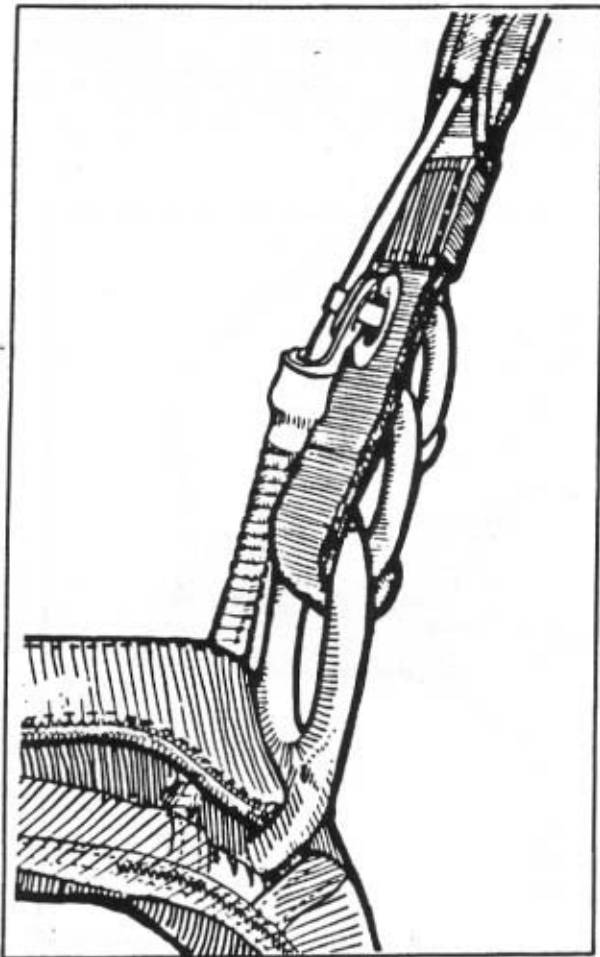


6. Thread the yellow cable through the white loop, making sure the loop isn't twisted. Be careful with the cable so you don't bend it too sharply or kink it. Insert the free end in the channel on the back of the riser.



7. Repeat the above steps with the other riser.

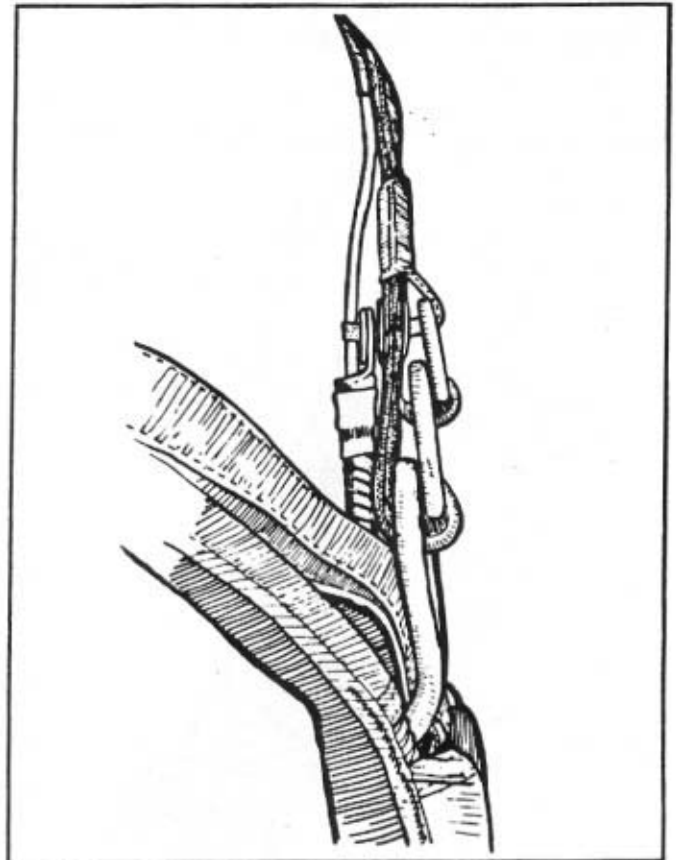




## PRE-JUMP INSPECTION

Before jumping the DOLPHIN, check the 3-Ring Release System for the following:

1. Each ring passes thru only one other ring.
2. The white loop passes thru only the small ring.
3. The white loop passes thru the grommet on the end of the cable housing without twisting.
4. Nothing passes thru the white loop except the yellow cable.
5. The 3-Ring Release handle is securely stuck to the harness, and no cable is visible between the handle and the cable housings. If your release handle has a tendency to hide itself under your main lift web, undo the Velcro and twist the handle in a counter-clockwise rotation (when wearing the rig) so the handle will stick-out and slightly forward for a better grip.



## NOTICE

If a DOLPHIN has been fitted with 3-Ring risers produced by any manufacturer other than ALTICO, it is important that they be checked for proper configuration. The side view above shows a correctly built 3-Ring riser attached to the harness ring and put under moderate tension. Note the following: (1) The rings overlap each other and maintain metal-to-metal contact with each other. (2) The rings are aligned in parallel planes. (3) The smallest ring is not pulled snug against the grommet; the white loop is long enough to give it some play. (4) The white locking loop goes straight down thru the center of the riser grommet on its way to the cable housing end fitting; it does not extend past the edge of the grommet hole and then turn back upward toward the hole. If your riser configuration does not match this illustration, the 3-Ring release might not function correctly. You should contact a rigger or ALTICO before jumping with those risers.

## REQUIRED PERIODIC MAINTENANCE FOR THE 3-RING

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The Booth 3-Ring Release System has been in use for many years with excellent results. Although the system is as durable as the rest of the rig, it requires periodic maintenance and inspection to ensure proper operation.

Generally, it is **NOT** recommended that the risers be attached to the harness when new and "forgotten." Like all skydiving gear, the 3-Ring Release should be carefully inspected and operated on a regular basis.

The procedure below should be done at least every month. This is especially important if the rig has not been used for a month or more, such as during the winter. Immediate inspection is required if it has been subjected to some abuse such as a drag across the runway, a water landing or exposure to a lot of dust or sand.

It's important to maintain the system even more in humid, muddy or freezing conditions. If the DOLPHIN becomes immersed in mud or muddy water, clean the 3-Ring Release system with a mild solution of soap and water. Any rusted components must be replaced.

1) Every month operate the 3-Ring Release system on the ground. Extract the cable completely from the housings and disconnect the risers.

2) While the system is disassembled, closely inspect it for wear. Check the white locking loops (the ones that pass over the smallest ring and through the grommet) to be sure they are not frayed.

3) Check the Velcro on the breakaway handle and main lift web to be sure it is clean and adequately holds the handle.

4) Check the cable ends for a smooth finish. The ends are finished at the factory to have a smooth, tapered surface. This prevents the cable from hanging up in the loop. Check the cable ends and consult a rigger or the manufacturer if a burr or "hook" is present.

5) Check the stitching, including that which holds the large rings to the harness.

6) Check the 3-Ring release housings for solid hand-tacking and proper stretch. The housing ends lay at the chest strap area. Pull downward on these housing ends and check that they don't move downward more than 1/2 inch. Pull the housings from the free end and expect 1 to 2 inches of movement.

7) Take each riser and vigorously twist and flex the webbing near where it passes through each ring. The idea is to remove any set or deformation in the webbing. Do the same thing with the white loop.

8) Check the housings for dents or other obstructions. Use the cable to do this.

9) Clean and lubricate the release cable with a light oil such as "3-in-1" brand or silicon. Put a few drops on a paper towel and firmly wipe the cable a few times. A thin, invisible film should remain --- too much will attract grit and dirt, or the oil could become tacky in cold weather. Too much oil will require more force to extract the cable during a breakaway.

10) Inspect the fittings at the end of each housing. If one of these fittings were to come off the housing, a riser might release prematurely.

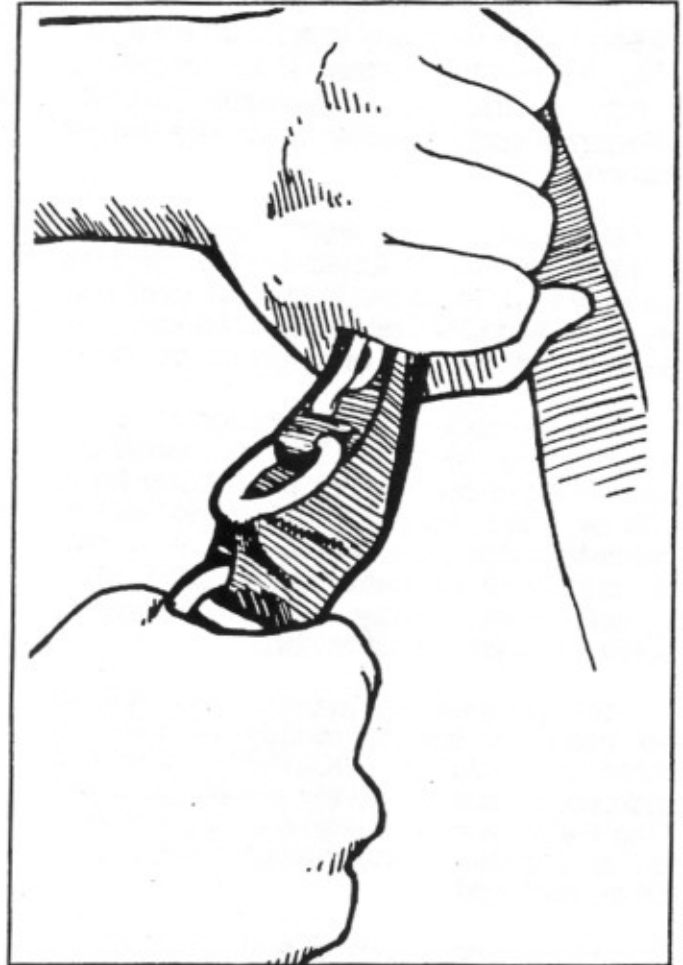
11) If any wear is found, consult with ALTICO or a rigger before using your DOLPHIN.

12) Reassemble the system. Double check it. Make sure the risers aren't reversed.

ALTICO appreciates any comments from users that relate to the safety, operation or maintenance of the 3-Ring Release, or any other part of the DOLPHIN harness/container system.

## REPLACEMENT PARTS

ALTICO supplies replacement parts for its products at a reasonable cost. When ordering parts for your rig, include the model number and date of manufacture so that the proper items can be supplied. This information appears on the label that is sewn to the rear surface of one of the reserve front risers. For a complete list of replacement parts, see page 1 of this manual.



## **DONNING THE DOLPHIN**

Prior to donning the DOLPHIN in preparation for a parachute jump, several items should be checked:

Both main and reserve containers closed correctly and pin covers secured.

Three-Ring Release system correctly assembled in accordance with the section in this manual entitled "THE 3-RING RELEASE SYSTEM."

Reserve ripcord handle properly stowed in the pocket just below the chest strap on the left main lift web. The ripcord should show 2" to 4" extra length at the handle.

Cutaway handle (aka "release handle") correctly stowed on velcro attachment just below the chest strap on the right main lift web.

Main bridle correctly routed from the curved pin closure to the pilot chute pouch.

Main pilot chute handle in correct position to be gripped for deployment.

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**This list assumes that the jumper and/or rigger has inspected the three principle components of the parachute system (main canopy, reserve canopy and harness/container system) and found them all to be airworthy prior to assembling and packing.**

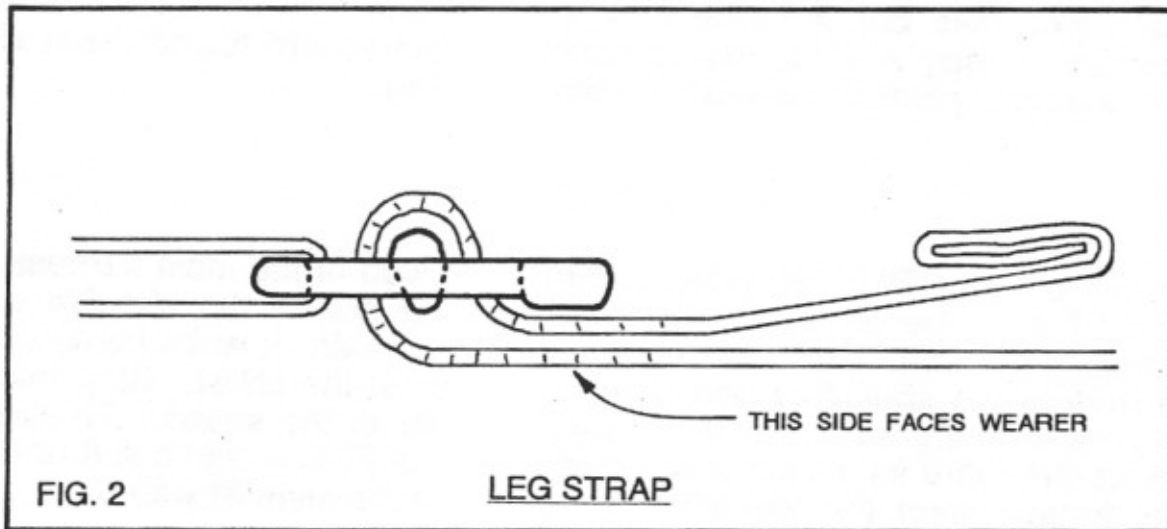
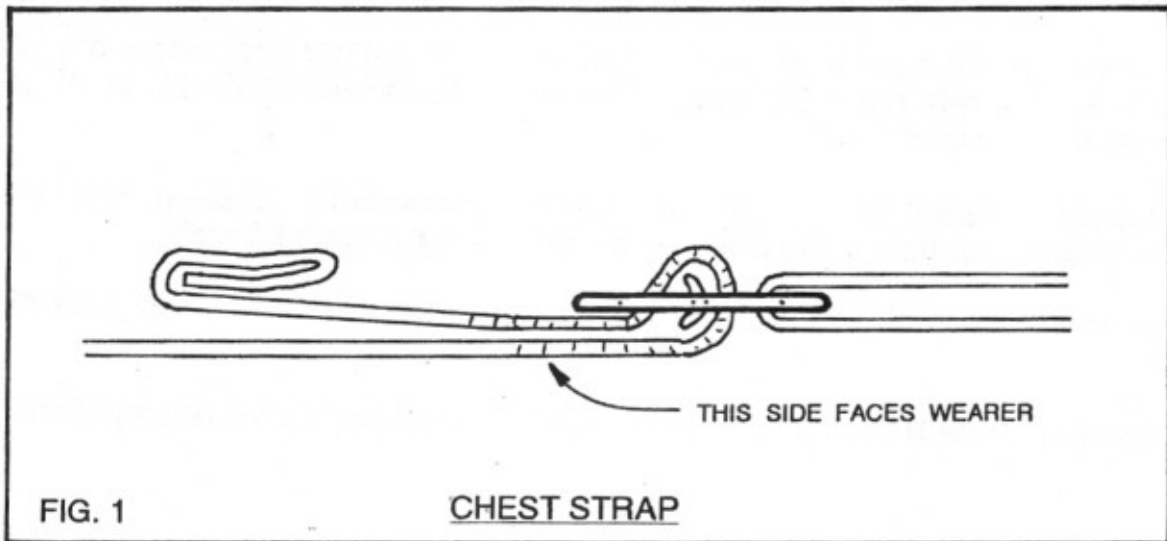
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To put on the DOLPHIN, grasp one main lift web at the main harness ring and lift it to the shoulders, settling the yoke across the shoulders and thrusting the arms out to the sides so that the main lift webs come across in front of the shoulders and down the sides of the chest. Step into the legstraps, being sure that there are no twists in the straps. Thread the chest strap thru its friction adaptor as shown in FIG. 1, and pull it until it is comfortably snug, but not so tight as to deform the main lift webs.

Pull the ends of the legstraps until they are snug, and stow the excess length by sticking it down into the legpad or by stowing it in an elastic band. It is important to be sure that these legstrap ends are secured, because a free end can be mistaken for some other handle in free fall.

After donning the DOLPHIN and tightening all the straps, take a moment to physically locate all the handles: main pilot chute handle, cutaway handle, reserve ripcord handle. Be absolutely sure that you are very familiar with the location of all three handles, and that you can find each one with your eyes closed.

Be sure that each legstrap has been correctly threaded thru its corresponding friction adapter. FIG. 2 shows the correct threading. This is very important, because an incorrectly threaded strap may not hold in its friction adapter when a load is applied to it.



\*\*\*

## **DOLPHIN MAIN DEPLOYMENT**

This section is intended only to acquaint the user with the design and intended function of the DOLPHIN harness/container system. It is *not* a course in parachute jumping. No one should attempt to make a parachute jump unless instructed and supervised by a qualified instructor.

Whether the DOLPHIN is equipped with a "throwout" pilot chute on the right legpad or on the bottom of container, the activation of the main parachute is much the same: while maintaining a stable face-to-earth position, grasp the handle at the mouth of the pilot chute pouch and with one motion, extract it and throw it vigorously *straight out* to the side. This is done to place the pilot chute in "clean air" for maximum drag.

It is generally considered ideal to be in a slightly head-high position during deployment, so that the area of the "burble" (turbulent air over the jumper's back) is reduced in size. Also, it is not advisable to hold on to the pilot chute after extraction from its pouch. Using the pilot chute for a "wave-off" could cause the drag on the bridle to open the container before the pilot chute is released. This is an out-of-sequence condition which may cause entanglement.

### **!! WARNING !!**

The main container of the standard skydiver's DOLPHIN is designed exclusively for use with a *throwout* pilot chute. A spring-loaded pilot chute is very likely to cause a total malfunction. Do not attempt to use a spring-loaded pilot chute in the main container of a DOLPHIN harness/container system unless the DOLPHIN is a Student Model.

## RESERVE DEPLOYMENT

This section is intended only to acquaint the user with the design and intended function of the DOLPHIN harness/container system. It is *not* a course in parachute jumping. No one should attempt to make a parachute jump unless instructed and supervised by a qualified instructor.

Activation of the DOLPHIN reserve container may be accomplished in three different ways:

- 1) Pulling the reserve ripcord manually. This is a metal handle located in a pouch just below the chest strap on the left main lift web.
- 2) Cutting away from the main canopy *with* a Reserve Static Line installed and connected. [Read the section in this manual entitled "RESERVE STATIC LINE (RSL).]
- 3) Using an Automatic Activation Device (AAD).

Generally, most sport parachute training centers train their students *not* to rely on an RSL or an AAD, but to activate the reserve manually if they decide that such action is appropriate. *It must be emphasized that this decision is the responsibility of the individual jumper.*

### CUTTING AWAY

If the main canopy has come out of the container, but is damaged or malfunctioned to the extent that it cannot be safely landed, it is called a *partial malfunction*, and it is considered best to jettison it ("cut it away") before activating the reserve so that it will not entangle with the reserve.

The 3-Ring Release system is designed to cut away the main canopy by simultaneously releasing both main risers. To activate the release system locate the release handle which is velcro'd to the right main lift web just below the chest strap. Grasp it with the right hand and peel it away from the velcro. Then *vigorously* pull it downward and outward to full arm's length.

Obviously, for the jumper to survive, cutting away *must* be followed by reserve deployment, and it must be initiated while there is sufficient altitude for reserve deployment. To activate the reserve, locate the metal handle in its pouch just below the chest strap on the main lift web. Pull it *vigorously* downward and outward to full arm's length. Again, it must be emphasized that these decisions and actions are the responsibility of the individual jumper.

If it is decided that there is not sufficient altitude for a cutaway, the jumper then must simply activate the reserve and hope that it won't entangle with the main.

In the case of a *total* malfunction (nothing has come out of the container, or it has become impossible to extract the pilot chute), the jumper will still be falling at high speed. It may be advisable in this case not to waste time and altitude cutting away from a canopy that is still in the container, but to simply activate the reserve. There are several schools of thought regarding when and if to cutaway, and it is best for the student to heed the instructor and develop a rehearsed plan of action for each emergency scenario.

Please read the section in this manual entitled "THE 3-RING RELEASE SYSTEM," for further information regarding operation, inspection and maintenance of the release system.

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## **INSPECTION, MAINTENANCE AND REPAIR**

Prevention of accidents is of prime importance in sport parachuting, and one way to help is to inspect the equipment on a consistent schedule and to perform preventive maintenance whenever necessary.

The following checklist is provided for a framework in developing your own inspection and maintenance schedule. It is suggested that inspections be performed every twenty jumps or every month, whichever is more frequent.

- 1) **MAIN PILOT CHUTE** - Watch for fraying of the tape which attaches the handle to the top of the pilot chute. Also inspect the stitches on the tape. If the tape is frayed, have it replaced. If the stitches are coming apart, restitch it. If the handle comes off when you are trying to pull the pilot chute out of its pouch, it may be impossible to deploy the main canopy.

The length of the centerline on a throwout pilot chute is very critical. It must be at least as long as the suspension tapes on the mesh, preferably about one inch longer. If the centerline is shorter than the suspension tapes, the pilot chute is very close to a configuration in which a drastic loss of drag can occur. However, it is easy to inspect the centerline. Simply hang the pilot chute upside down by its attachment point to the bridle, and compare the length of the centerline to the length of the suspension tapes.

- 2) **MAIN BRIDLE** - Check the entire length for abrasion or cuts. Pay close attention to the attachment of the curved pin. The tape must be replaced if it is frayed at all, and any broken stitches must be re sewn. If the curved pin comes off the bridle during deployment, it may leave the jumper with a pilot chute in tow from a closed container.
- 3) **MAIN DEPLOYMENT BAG** - Inspect the attachment of the bridle to the main bag (or *through* the main bag to the top of the canopy). Be sure that the locking stow rubber bands are strong and in good condition. If a locking stow breaks during deployment, the canopy could be dumped out into the deploying lines, inviting an entanglement.

- 4) **RISERS** - The control line guide rings should be inspected to assure that their attachment to the riser is secure. Also check the riser's locking loop for fraying, and check the grommet for any sharp edges which might damage the loop.
- 5) **CONTROL TOGGLES** - The attachment of the control line to the control toggle is important. Check for fraying and be sure that the knot is secure. If a control line breaks or a toggle comes off the line when the jumper is near the ground, the jumper may not have time to regain control before landing.
- 6) **CLOSING FLAP GROMMETS** - Inspect for any sharp edges that may fray the closing loops. Replace if necessary.
- 7) **FLAP STIFFENERS** - If a stiffener is cracked or broken it must be replaced.
- 8) **CLOSING LOOPS** - At the first sign of fraying, replace the closing loop. (They're cheap or even free at most parachute centers.) If a closing loop breaks at an inappropriate time, it can cause a world of trouble.
- 9) **HARNESS** - Look at all exposed parts of the harness webbing and check for fraying or cuts. If the edge of any harness webbing is worn or cut to a depth of more than 1/8", it must be repaired or replaced. Broken harness stitching must be repaired before it becomes critical.
- 10) **RIPCORDER** - During the required periodic repacking of the reserve, inspect the cable for broken strands of wire, particularly near the swaged fittings. If any strands are broken, replace the ripcord. If the ripcord pin is bent at an angle of no more than ten degrees, it may be carefully straightened with pliers and a vise, provided that the pin is protected from abrasion by buffers of wood, plastic, cloth, or any other material which will not scar the pin. This may only be done *once* per pin.
- 11) **HOUSINGS** - Be sure that the hand-tacking on both the release housings and the reserve ripcord housing are secure.

The foregoing list includes several items which often are neglected even though they may pass through the hands of the jumper every time the parachute is packed. In a complete system there are other components not manufactured by ALTICO which should be inspected according to instructions by their manufacturer. (This includes both the main and reserve canopies.) Also, please refer to the section in this manual entitled "THE 3-RING RELEASE SYSTEM."

Minor repairs may be performed on the DOLPHIN by an appropriately rated rigger, provided he or she has the necessary equipment, materials, knowledge and skill to emulate the original manufacture. However, if in doubt, it is best to return the harness/container system to the manufacturer for repair. Any repair which would be considered *major* must be performed by an FAA Master Rigger or by the manufacturer. (A major repair is one which, if performed incorrectly, would affect the airworthiness of the article.)

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## COMPATIBILITY STATEMENT

The functional tests of the DOLPHIN reserve container were performed using the FIRELITE, MAVERICK and SHARPCHUTER reserve canopies. All tests resulted in successful deployments as expected. These tests indicate that the DOLPHIN reserve container is compatible with any ram air reserve canopy which can be deployed from a free bag, provided the pack volume of the canopy is compatible with the size of the reserve container.

It is difficult to assign an absolute figure for the pack volume of a canopy or a container, because pack volume is greatly affected by changes in temperature and humidity. A canopy that is easy to pack in a given container in a warm and humid environment may be almost impossible to pack in the same container in a cold and dry climate.

It is the responsibility of the rigger packing the reserve to determine that the respective volumes of the canopy and container are compatible. Overstuffing the container may result in damaged grommets, excessive wear at "hard points", or increased pull force required for reserve activation. On the other hand, a pack that is too loose may allow shifting of its contents, and it may not provide a firm base for launch of the pilot chute. Another danger of too loose a pack is that the closing pin may simply fall out.

To assist in matching the volumes of canopies with container systems, the Parachute Industry Association (PIA) has compiled a Canopy Study which may be used as a rough guide. This Canopy Study (PIA Technical Standard 104.7) lists the pack volumes and square footage for most canopies of present and recent manufacture, and is an ongoing project sponsored by the Technical Committee of the PIA. Future editions may be obtained by contacting the PIA Store, P.O. Box 2206, Santa Barbara, CA 93118.

The DOLPHIN containers were sized using canopies with Spectra line (Microline) and with a CYPRES AAD installed in the reserve container. For selection of the correct DOLPHIN container system the following table provides a guide to approximate pack volumes and approximate canopy sizes (expressed in square feet), but it must be emphasized that there is a fair amount of latitude on each side of these figures. If a given combination of main and reserve canopies packs comfortably in the recommended size containers, the same canopies can probably be packed in the next smaller or the next larger size container system. Within this range of compatibility, it is up to the wearer to decide whether he or she prefers a smaller but tighter and stiffer rig, or a larger but softer (and perhaps more comfortable) rig.

<u>CONTAINER</u>	<u>RESERVE</u>	<u>MAIN</u>
MINI-D	120	120
D-1	130	150
D-2	150	170
D-3	170	190
D-4	200	220
D-5	220	250
D-6	240	280
D-7	280	320